

APRIL 2, 1914

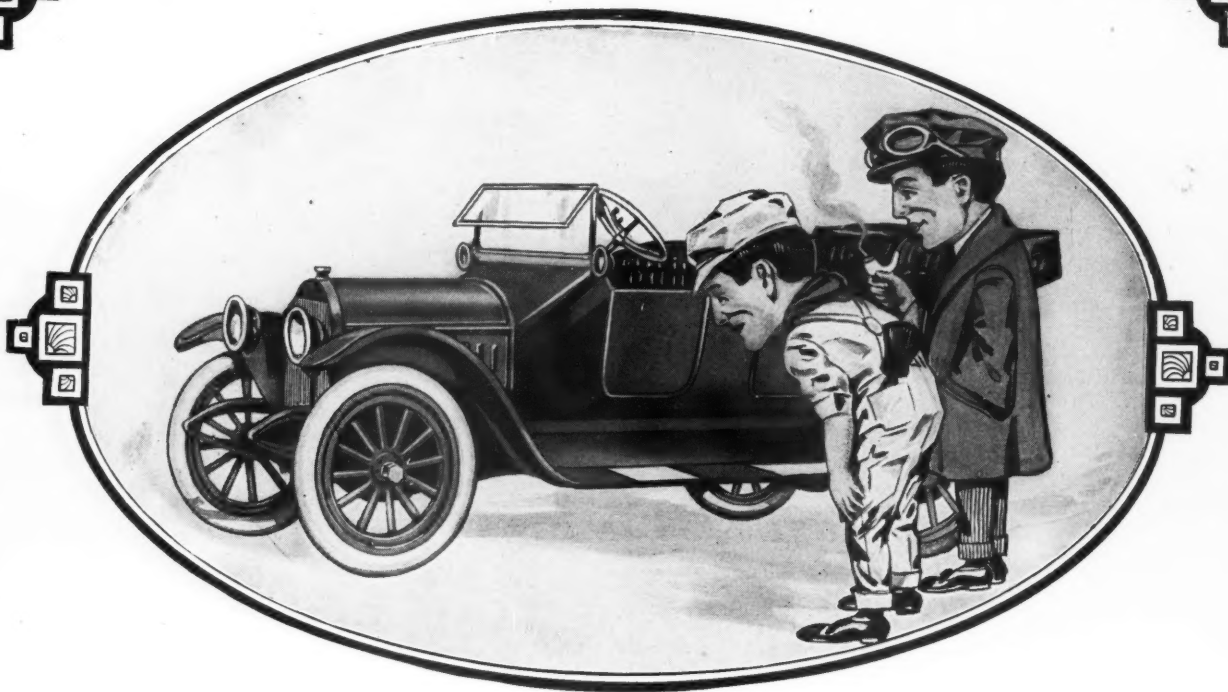
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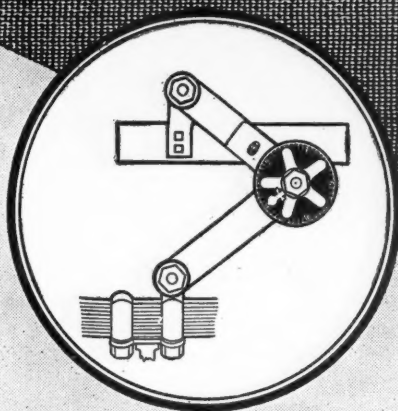
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MOTOR AGE

In the Wake of Mark Twain *Transcontinental Routes and How to Use Them*



"A petulant cannonading interrupted the ghost of the express rider. Its companions dropped flat upon their stomachs as a motor car, with cutout open, shot across the great American plains"

parent legs. The spook of the bearded Mormon elder called to the shades of its nineteen wives. The specter of Desperado Slade tugged at an imaginary rope about its neck, a rope that was anything but imaginary when the vigilantes of Montana placed it there. The apparition of a cavalryman who had died with Custer at the Little Big Horn stuck its finger in a hole where its fourth and fifth ribs should have been. The ghost of a '49er cast to one side its pan and leveled a rifle at the shade of a slinking Sioux.

"It was 68 years ago tonight," the shade of Pony Bob began, "when a red devil took a fancy to my scalp and —"

A petulant cannonading interrupted the ghost of the express rider. Its companions dropped flat upon their stomachs as a motor car, with cutout open, shot across the great American plains. For fully five minutes the seven specters watched the vehicle of insinuation, following it with opaque eyes until the snarl of its warning signal scarcely could be heard. Then the spook of Desperado Slade summoned up its courage and addressed the assembled shades.

"With them thar motor cars and tourists," it growled, "this country ain't safe no more, and it's gittin' warse ev'ry day."

* * *

YOU may challenge the veracity of this epilogue. My only defense is that it was told me by a Halsted street medium, the seventh sister of a seventh

By J. C. Burton

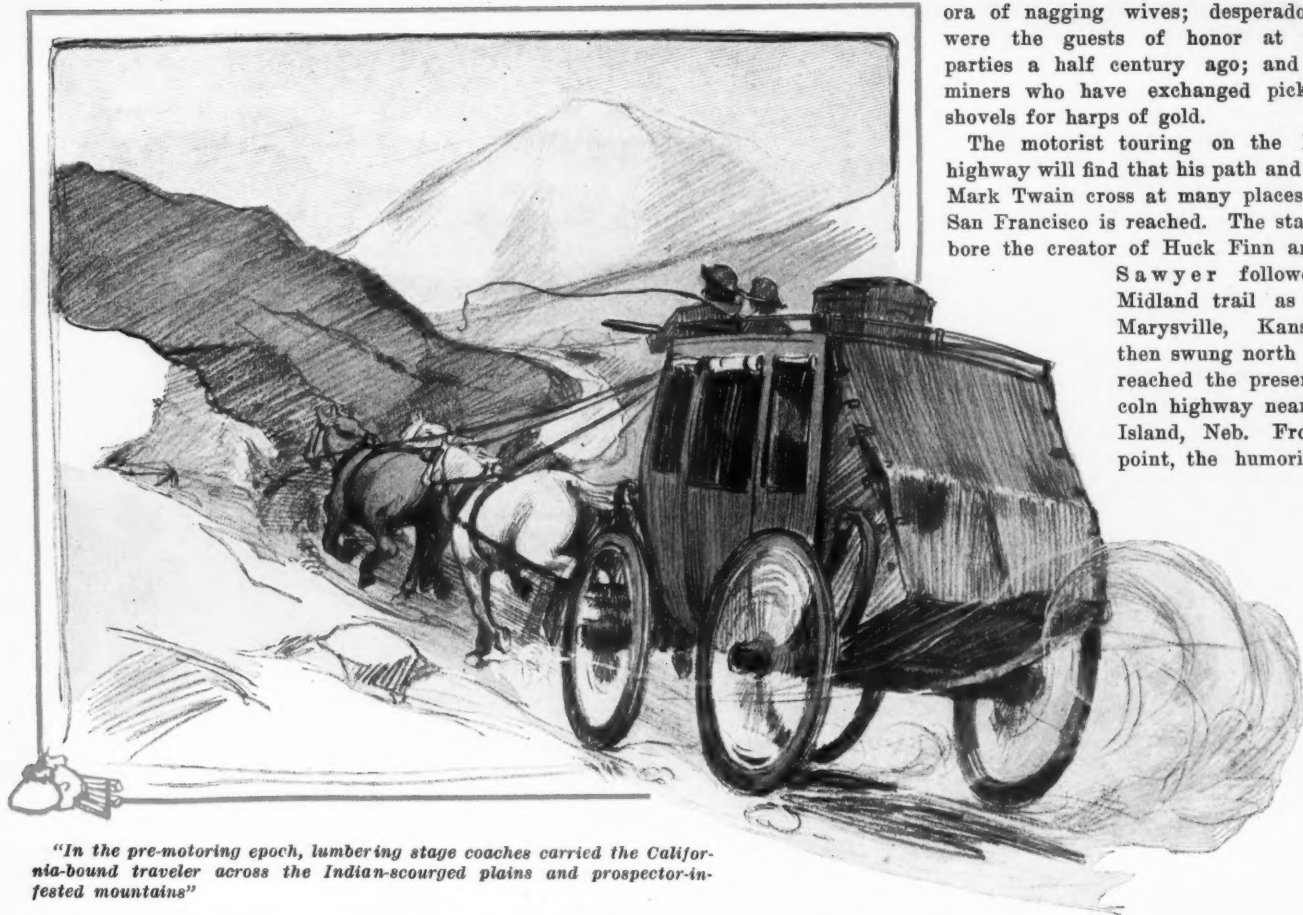
mental traveler and the lust for adventure was great, the members of this ghostly mid-night company were famous and feared from St. Joe clear across the plains and mountains to Carson City. Their names and deeds are written boldly on the red pages of frontier history.

The wraith of the stage coach driver cracked its phantom whip. The ghost of Pony Bob, express rider, stretched its trans-

EAST night, at the witching hour of 12, a hungry coyote abandoned a sun-bleached skull and yelped thrice at the intruding moon.

In answer to this dismal reveille, seven spirits from the other world slunk out from the great unknown and hovered over the historic Overland trail.

Three score or more years ago, when red blood flowed in the veins of the transconti-



"In the pre-motoring epoch, lumbering stage coaches carried the California-bound traveler across the Indian-scourged plains and prospector-infested mountains"

sister, and she ought to know. At any rate, forget it. This was not intended to be a ghost story.

The Coast Migration Stupendous

Major and minor prophets of motordom, making a mind bet on what looks to be a "sure thing," predict that at least 33 per cent of the motorists of the United States are planning to tour to the Pacific coast either this year or next when the Panama-Pacific exposition, commemorating the opening of Goethal's gigantic gulch and the nuptials of two oceans, will be held in San Francisco and furnish another and somewhat superfluous incentive for a western motor migration.

The fulfillment of such a prophecy means that approximately 150,000 motor cars will follow in the wake of the forsaken prairie schooners, stage coaches and freighters' wagons that a century ago started to blaze a red trail across the American continent and that a half million modern disciples of Ulysses will participate in a transcontinental trek before the first snows of 1915 fall. Like the "course of empire," touring in this country gradually has wended its way westward, but the song of the motors as they hum along the paths of the pioneers is just about to reach its fullest crescendo.

In the pre-motoring epoch and when lumbering stage coaches carried

the California-bound traveler across the Indian-scourged plains and prospector-infested mountains, a nomad printer and Mississippi river pilot, who afterward became famous as Mark Twain, threw caution to the four winds, turned desperate vagabond and set out from St. Joseph, Mo., in search of fortune in the lucrative ranges and foothills of the far west. His most valued traveling companion was 6 pounds of unabridged dictionary which saved the 18-day journey to Carson City from the curse of monotony. The printer-pilot found the etymological tome a sure cure for insomnia and nostalgia.

The Log of Mark Twain

Twenty years after this perilous pilgrimage, Mark Twain wrote a log of his journey and christened it "Roughing It." The modern Pacific coast traveler, selecting the Lincoln highway as his route, will find this book as excellent a traveling companion as the humorist did the 6 pounds of unabridged dictionary. Its perusal will supply much of the atmosphere that is no more on the Overland trail—Indians whose descendants are now learning the forward pass and fadeaway slide at Carlisle; buffalo that were served as fillet mignon a la frontier before the pure food law was passed; wholesale-marrying Mormons whom death has divorced from a pleth-

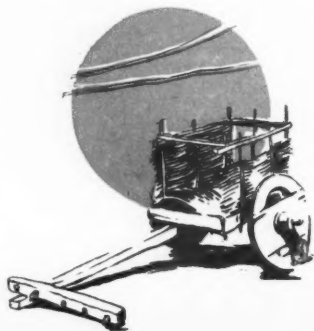
ora of nagging wives; desperados who were the guests of honor at neektie parties a half century ago; and grisly miners who have exchanged picks and shovels for harps of gold.

The motorist touring on the Lincoln highway will find that his path and that of Mark Twain cross at many places before San Francisco is reached. The stage that bore the creator of Huck Finn and Tom Sawyer followed the Midland trail as far as Marysville, Kans., and then swung north until it reached the present Lincoln highway near Grand Island, Neb. From this point, the humorist rode

over the ocean-to-ocean road that has been dedicated to the memory of the civil war president as far as Salt Lake City where the stage took the direct route across the heart of the Great American desert.

Jack Slade, King of Desperados

In "Roughing It," Twain describes his adventures at Kearney, North Platte, Julesburg, Laramie and Fort Bridger. He tells of passing the scenes of Indian mail robberies and massacres on the plains of Nebraska and of meeting at a stage station near Laramie the much-feared Slade, division agent on the Overland route and daring desperado, a man "whose hands and heart and soul were steeped in the blood of offenders against his dignity; a man who awfully avenged all injuries, affronts, insults or slights of whatever kind—on the spot if he could, years afterward if lack of proper opportunity compelled it; a man whose hate tortured him day and night till vengeance appeased it—and not an ordinary vengeance either, but his enemy's absolute death, nothing less; a man whose face would light up with a terrible joy when he surprised a foe and had him at a disadvantage. A high and efficient servant of the Overland, an outlaw among outlaws and yet their relentless scourge, Slade was at once the most bloody, the most dangerous and the most valuable citizen that inhabited the savage fastnesses of the mountains." It was at Julesburg, Colo., that Slade made his headquarters and from Kearney west



"he was feared a great deal more than the Almighty."

Slade is no more. He died with a rope about his neck and a coward's plea for clemency on his lips. Gone too are the buffalo that Twain hunted in Nebraska when the stage coach broke down; the pony express rider of spirit and endurance who carried letters bearing a \$5 postage stamp; the roving bands of hostile Indians that lay in ambush to attack stage coach and prairie schooner, but every milestone on the Lincoln highway tells a story of heroism, sacrifice and martyrdom.

Among the many questions that the prospective transcontinental tourists are asking now, the following are most common:

"What is the best route to take to the Pacific coast?"

"What are the road conditions?"

"How much time will a trip of such a nature take?"

"What will be the cost?"

And the magnitude of the impending migration to the Pacific depends largely upon how satisfactorily these and less pertinent questions are answered.

Three Routes from Chicago

Radiating from Chicago, which is a natural control for eastern and middle western tourists alike, are three transcontinental motoring routes that have their termini in California—the Lincoln highway, which follows the historic Overland trail practically all the way and

time to devote to such a trip. It has been more extensively advertised and improved than either of the others, is the shortest route of the three and is especially rich in historic attractions. The Midland trail will appeal to that legion of motorists who admire mountain scenery and are not adverse to suffering some rough going in order to pay homage to the snow-turbaned sultans of the sky, as this route pierces Colorado and offers an opportunity for an exploration of the magnificent Rockies. The Santa Fe trail is the late fall and winter

route ideal and will be selected by many motorists who plan to start for the coast at a time when the other two routes either are snow-covered or sluggish with mud and consequently unfit for touring. The Santa Fe trail is a highway of romance and mysticism, touching the most un-American points in all America—prehistoric ruins of the cliff dwellers, picturesque Indian pueblos and ancient cities founded before the invasion of the Spanish conquistadors. The motorists following this route also can visit the Grand Canyon by making a short detour of 83 miles at Flagstaff.

In the matter of distance, there is very little to choose among the three routes, as

the difference between the shortest and the longest is only 600 miles, 30 gallons of gasoline or 5 additional days of travel, according to the standard by which you measure it. From Chicago to San Francisco by the Lincoln highway is 2,600 miles; by the Midland trail, 2,850 miles; and by the Santa Fe trail, 3,200 miles. The three routes can be roughly charted by cities as follows:

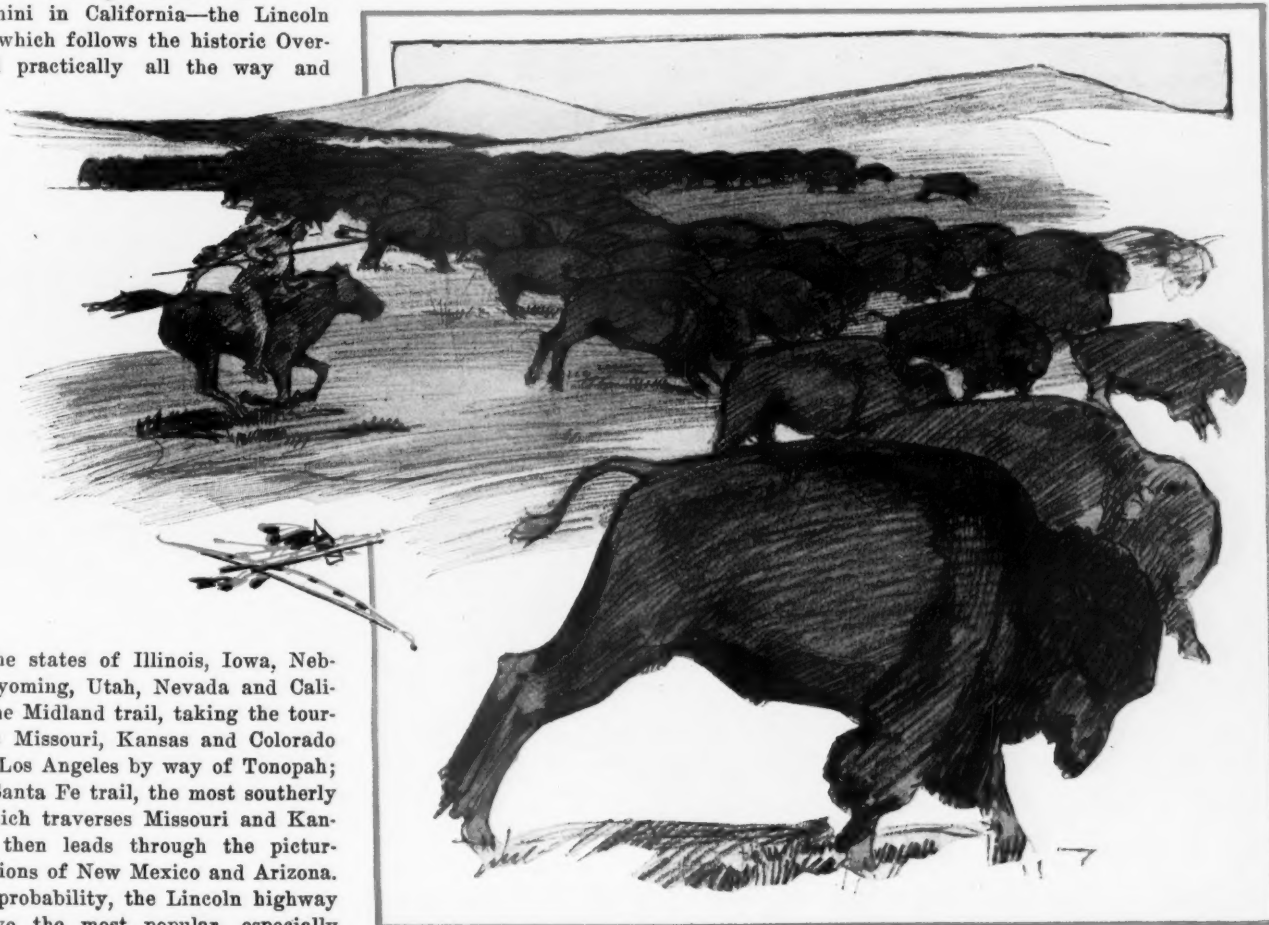
Lincoln Highway—Chicago to Sterling, Ill., via Aurora, Dixon, DeKalb and Rochelle. Clinton and Davenport are the optional points west of the Mississippi at which the across-Iowa trip is begun. The former is the eastern terminus of the transcontinental road, the recognized Iowa link of the Lincoln highway, which passes through Cedar Rapids, Marshalltown and Grand Junction.

The other trans-Iowa route is the Great White Way, which starts at Davenport and goes to Omaha via Muscatine, Oskaloosa and Des Moines. Omaha to Cheyenne via Columbus, Grand Island, Kearney, North Platte, Big Spring and Pine Bluff. At Big Spring a detour to Denver can be made by taking the road leading through Julesburg, Sterling and Fort Morgan. Cheyenne to Salt Lake City via Laramie, Rawlins and Evanston.

From Salt Lake City, there are two optional routes into Nevada. The northern and preferred route goes through Ogden, Brigham and Kelton and joins the main highway at Eureka, Nev. The southern route, which goes through isolated country with but one stopping place, Kearney's Ranch, is shorter and takes the tourist into Ely, Nev. Ely or Eureka to Reno via Austin, Fallon, Hazen and Wadsworth.

There are optional routes around Lake Tahoe, one skirting the northern shores of the lake and the other going south to Carson City. They join at Sacramento, which is only an 80-mile run from San Francisco.

Midland Trail—Chicago to Hannibal, Mo., via Ottawa, Princeton, Galesburg, Macomb and Quincy. Hannibal to St. Joseph, Mo., via Brookfield and Chillicothe. The Kansas link of this route is the Rock Island highway, which passes through Hiawatha, Marysville, Washington, Belleville, Smith Center, Norton, Colby and Goodland. Goodland, Kan., to Colorado



crosses the states of Illinois, Iowa, Nebraska, Wyoming, Utah, Nevada and California; the Midland trail, taking the tourist across Missouri, Kansas and Colorado and into Los Angeles by way of Tonopah; and the Santa Fe trail, the most southerly route, which traverses Missouri and Kansas and then leads through the picturesque regions of New Mexico and Arizona.

In all probability, the Lincoln highway will prove the most popular, especially with those tourists who have but a limited

"Gone, too, are the herds of buffalo that Mark Twain hunted when the stage coach broke down"



Relief map of the United States showing three transcontinental motoring highways radiating from Chicago—the Lincoln highway, the Midland trail and the Santa Fe trail—and in addition, the Northwest trail, leading across the states of Minnesota, North Dakota and Montana and tapping

Springs via Burlington and Limon, Colorado Springs to Grand Junction, Colo., via Buena Vista, Leadville, Glenwood Springs and Rifle. Grand Junction to Salt Lake City via Thompson, Green River, Price, Colton and Provo. Between Salt Lake City and Ely, Nev., the Lincoln highway serves as a link of the Midland trail. Arriving at Ely, the tourist may continue on the Lincoln highway to San Francisco or follow the Midland trail south through Tonopah and Goldfield to Independence, Cal., and Los Angeles and thence north on the Camino Real through Santa Barbara, Paso Robles and Santa Cruz to the metropolis of the Pacific coast.

Santa Fe Trail—Chicago to St. Louis via

Pontiac, Bloomington and Springfield. St. Louis to Kansas City on the Boones Lick road, which passes through St. Charles, Columbia, Boonville, Marshall and Higginsville. There are optional routes across Kansas. One, the Golden Belt, passes through Topeka, Salina, Oakley and Colby and takes the tourist into Colorado Springs, whence a detour to Trinidad, Colo., will be necessary in order to pick up the Santa Fe trail again.

The other goes through Osage, Council Grove, McPherson, Great Bend, Dodge City and Syracuse and leads direct to Trinidad by way of La Junta, Colo. Trinidad to Springerville, Ariz., via Raton, N. M.; Las Vegas, N. M.; Santa Fe, Albuquerque, Socorro, N. M.,

and Magdalena, N. M. Tourists wishing to visit the Grand Canyon must detour at Springerville and travel north through the petrified forest, Holbrook, Winslow and Flagstaff.

The return trip can be made by way of Williams and Prescott to Phoenix, where the main highway is picked up again. Springerville to Yuma, Ariz., via Cooley's Ranch, Fort Apache, Rice, Globe, Roosevelt Dam, Buckeye and Dome. Yuma to San Francisco via San Diego, Los Angeles, Santa Barbara, Monterey and Santa Cruz.

It would be impossible, as well as unjust, to stamp one route as superior to the



Yellowstone park, and the Borderland route, starting at Savannah, crossing Georgia, Alabama, Arkansas, Texas, New Mexico and Arizona and terminating at San Diego

other two. All three are excellent trans-continental motor highways and have many advantages in common. At the same time, each has a distinct historic and scenic appeal. The final choice must be left to the individual whose ultimate selection probably will hinge on the amount of time he wishes to spend and the kind of country he wishes to visit.

Road Conditions

As the three routes take in only twelve states in all, the road conditions can best be summed up by common-wealths, as follows:

Illinois—Natural dirt roads which are being constantly improved. There is little reason to anticipate trouble except immediately following heavy rains.

Iowa—Natural dirt roads, graded and dragged. Very fast in summer and excellent for motoring except in the rainy season. Pathfinders claim that the Great White Way, with banked turns, few jogs and wide, smooth stretches, is the premier route across the state and advise its selection in preference to the Iowa link of the Lincoln highway.

Missouri—Improved dirt roads with a considerable amount of stone highways constructed by the state.

Nebraska—Improved dirt roads with a few sandy stretches. The latter, however, should be almost eliminated by the time the 1914 touring season opens.

Kansas—Improved dirt roads, not the equal of the Iowa highways, but far better than the average.

The roads in the above mentioned five states are marked by good bridges and the absence of fords.

Wyoming—The majority of the roads are of gravelly dirt with a few rough stretches that are being constantly improved. There are some dry washes to cross, although bridges are being put in very fast and the steep grades at the arroyos are being cut down.

Colorado—Highways generally are fine. The mountain roads are of gravel and decomposed granite and all improved by county and state authorities.

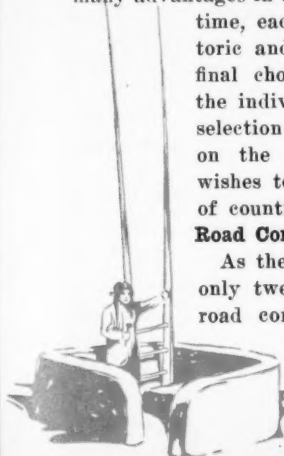
Utah—Great amount of desert road with some rough grades. Tourists, following the Midland trail, will find the run from Grand Junction to Price difficult because of the sandy stretches and the lack of improvements. Of the two routes from Salt Lake City into Nevada, the one by way of Ogden and Eureka is preferred. It follows the railroad most of the way and has more frequent habitations and accommodations.

The Salt Lake to Ely route, across the southern edge of the Great American desert, is a 2-day run with long stretches between habitations and only one stop, Kearney's Ranch, in 212 miles. Travel over this route is liable to be dangerous for the inexperienced tourist going alone. The Ogden-Eureka route is longer in mileage but the road conditions are as good as not better than those on the Ely route and chances for meeting misfortune are not as great.

Nevada—Fine natural road of gravelly dirt. California—Noted for its excellent motoring roads, many of which are of asphaltum and constructed by the state.

New Mexico—Improved roads of a gravel, dirt and sand mixture; graded and dragged and as wide as city boulevards.

Arizona—Majority of the roads are of a fine gravelly dirt with some highways of volcanic dust, which is an excellent road material. Santa Fe trail tourists may have some difficulty



on the run from Phoenix to Yuma on account of the sandy stretches.

Faint-hearted indeed is the motorist who abandons a tour to the coast because he fears that the road conditions will change travel to travail. True, he may encounter some rough stretches and steep grades, but if he uses caution, common sense and his tongue, he should bring his car and party through without any accidents other than those minor mishaps that add a zest and a laugh to the journey and appeal to the spirit of adventure that is our common heritage. While many transcontinental trips are made in single cars without accident or difficulty, it is advisable that two or more cars travel together, especially in the sparsely settled sections of the west, as a guarantee of mutual protection. In case of accident to one, the other can render immediate aid or be sent back over the trail for supplies.

The transcontinental tourist wishing to derive the greatest amount of pleasure and benefit from his trip must be prodigal of time. Those who select either the Lincoln highway or the Midland trail as the line of least resistance for their trek should set aside at least 3 weeks for the journey each way and then they will have little time for side trips and stops at places of historic and scenic appeal.

The Santa Fe trail a traveler must be even more generous with his time if he expects to see a fourth of all that is worth seeing. Two months is none too much to spend on a tour over this historic route that leads through a region of mystery, romance and scenic grandeur.

The expense of the trip is what you make it. You can travel de luxe and stop at the most expensive hotels or you can practice economy and camp along the way. A fair, but not a liberal, estimate of the cost would be \$5 per day per person and an equal amount per day for the running expenses and storage of the car.

West is Hospitable

There is no reason why the transcontinental traveler should want for food and a bed. The average town of 2,500 inhabitants in the west boasts of as pretentious a hotel as the city of 20,000 population in the east. The rates are most reasonable: the holdup men of the frontier days, after



"Gambling was the universal passion of high and low in New Mexico and many a Spanish don and American trader, who had taken over tens of thousands in the barter for the caravan, wasted it over the gaming table"

their reformation, did not turn inn keepers. For the remote emergency and providing he plans to travel across the waste country, the motorist should carry a small supply of food and a piece of tarpaulin which can be used as a shelter. Water bags and a canvas water bucket are a necessary part of the equipment and blankets will prove serviceable in the mountain regions where in mid-summer the mercury in the thermometer drops suddenly after sunset.

There is another question that the prospective transcontinental pilgrims are asking—"What will I see?" In attempting to answer it, I must turn back the pages of history and invoke the muse of superlative adjectives, for each of the three ocean-to-ocean routes taps a lode vein of fabulous historic and scenic richness. They are trails that go under the veil that conceals the dramatic past, trails that lead to peaks and chasms that are the masterpieces of that master sculptor, Time.

The predecessors of the modern westward-bound traveler were red-blooded men who left as a heritage volumes of romance, part of which has been written but most of which is buried with them. Their rifles barked where now the motor hums its song of progress. Their campfires lighted up the plains where now the lamps of gaso-

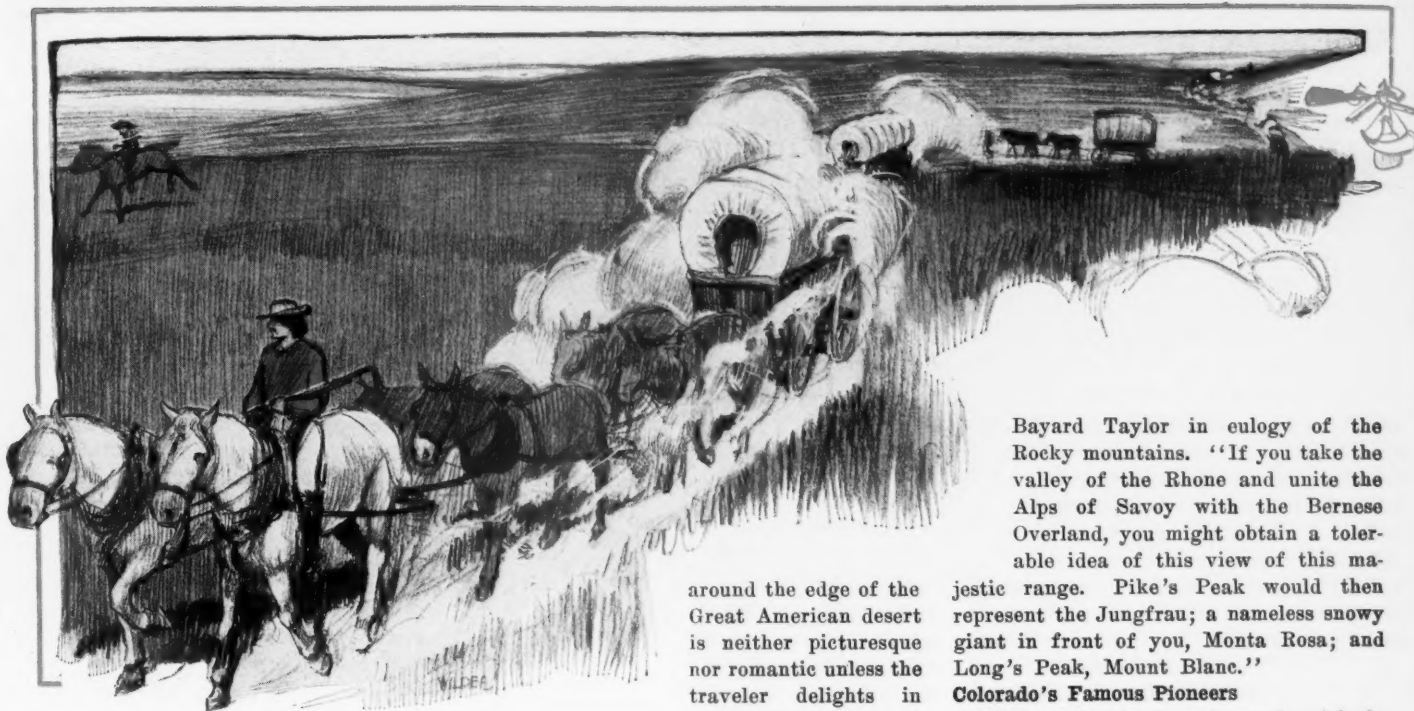
line-burning pilgrims send forth a friendly glare. They were makers of history, these intrepid frontiersmen and early settlers, who blazed the westward trail a century ago.

Trapper's Homestead at Boone

With the possible exception of Boone, where the old Boone residence still is occupied by a nephew of the famous trapper and frontiersman after whom the town is named, Iowa has few historic attractions to offer, but once in Nebraska, the motorist follows in the wake of the Mormons and California gold-seekers and rides over prairies where once the buffalo roamed and the squaws pitched tepees for their painted braves. Thirty-five miles west of Omaha, a metropolis that 60 years ago was on the very edge of the wilderness, is Fremont, a former Pawnee village. On the north bank of the Platte river and but a short distance from Central City stands Lone Tree monument, marking the site of a giant cottonwood that served as a guide for the Mormons as early as 1833.

Kearney and vicinity is rich in tales of Indian massacres and last-stand hand-to-hand encounters and a few miles south of the town are the ruins of the old fort established by the government for the pro-





"An uproar of whinnying and braying, the clank of chains and then the captain's shout, 'Stretch out,' when the long line of twenty or thirty white-tented wagons would ramble out for the journey of 30 to 60 days across the plains"

tection of the pioneers from the attacks of the hostile Sioux. North Platte is famous as the former home of Buffalo Bill, whose ranch of 3,000 acres is now occupied by his daughter and her husband. It was from this settlement that the Grand Duke Alexis of Russia, General Phil Sheridan and Buffalo Bill went on an historic bison hunt in 1872 when the surrounding country was the greatest big game hunting ground in all America.

Ogalalla, 53 miles west of North Platte, is famous as the terminus of the Texas cattle drives of 1870 to 1885, and at Big Springs, a few miles further on, the oldest inhabitants point with pride to a large tree under whose branches a band of desperadoes, who held up the Union Pacific in 1873, divided \$60,000 in golden swag before escaping to Kansas.

Crossing the Continental Divide

Twenty-four miles beyond Cheyenne, the Lincoln highway crosses the great continental divide at an altitude of 8,000 feet. At this point has been erected the Ames monument as a memorial to the two brothers who were largely responsible for the completion of the Union Pacific Railroad. Pike's peak towers above the other mountains to the south and the tourist has left the plains and their red romances behind him.

Salt Lake City, a colossal monument to the courage, tenacity and foresight of the persecuted Mormon pioneers, is the next point of interest on the route. The ride

around the edge of the Great American desert is neither picturesque nor romantic unless the traveler delights in morbid speculation and imagines the sufferings and tragedies that marked the early journeys across this

waste land of alkali and sand.

Nevada is a land of realized ambitions and blasted hopes. All along the route from Ely to Carson City the miners' picks and shovels have dented the earth's strata with romance. Piles of ore mirror the smiles of fickle fortune. Huge smelters tell the story of hardships overcome and wealth amassed. Rusty dump carts mark the sites of abandoned claims.

Lake of Changing Color

Once across the state line and in California, the interest of the motorist is centered in two lakes. One is Lake Tahoe, noted for its beauty and changing color, and the other is Donner Lake, scene of heroism and tragedy and named for the ill-fated Donner party of emigrants who died of starvation on its shores in 1847.

In following the Midland trail to California, the motorist will find places equally as historic as those on the Lincoln highway, but should arrange to do most of his sight-seeing in Colorado, where the Rocky mountains will hold him under their spell. The view of the snow-topped peaks which the traveler gains on approaching Colorado Springs from the east is one of awe-inspiring beauty.

"I know of no external picture of the Alps that can be placed beside it," writes

Bayard Taylor in eulogy of the Rocky mountains. "If you take the valley of the Rhone and unite the Alps of Savoy with the Bernese Overland, you might obtain a tolerable idea of this view of this majestic range. Pike's Peak would then represent the Jungfrau; a nameless snowy giant in front of you, Mont Rosa; and Long's Peak, Mount Blanc."

Colorado's Famous Pioneers

While Colorado is not overly rich in traditions and romantic associations, its history has many stirring pages. The names of Pike, Fremont, Gunnison, Marcy, Lupton, St. Vrain, the Bents, Dick Wootton, Kit Carson and Jim Baker, recall the explorations and thrilling events of the storied past. It has been the theater for the adventures of trappers, hunters, freighters and pioneers and tragedy and romance have played their parts in the mining regions.

On the Santa Fe trail, mystery and romance await the motorist. This historic highway goes through the most ancient section of the United States. On it is Santa Fe, perhaps the oldest city in all America; the tiered houses of resourceful Indian tribes and the aeon-old dwellings of the cave man. It is surrounded by an atmosphere of peace and quiet. The southwest is Spain transplanted in America.

There is no more picturesque description of the Santa Fe trail as it was a century or more ago than that written by Agnes Laut in her book of genuine appreciation of "Our Unknown Southwest."

"Let us take a look at these caravan brigades of the traders of the southwest!" she writes. "Teams were hitched tandem to the white-tented wagons. Drivers did not ride in the wagons. They rode astride mule or horse, with long bull whips as thick as a snake's skin, which could reach from rear to fore team. I don't know

how they do it; but when the drivers lash their whips out full length, they cause a crackling like pistol shots. The owner of the caravan was usually some gentleman adventurer from Vir-



ginia or Kentucky or Louisiana or Missouri; but each caravan had its captain to command and its outriders to scout for Indians. These scouts were of every station of life with morals of as varied aspect as Joseph's coat of many colors. Kit Carson was once one of these scouts. Governor Bent was one of the traders. Stephen B. Elkins first came to New Mexico with a bull whacker's caravan. In the morning every teamster would vie with his fellows to hitch up fastest. Teams ready, he would mount and call back—"All's set." An uproar of whinnying and braying, the clank of chains, and then the captain's shout—"Stretch out," when the long line of twenty or thirty white-tented wagons would rumble out for the journey of 30 to 60 days across the plains. Each wagon had five yoke of oxen, with six or eight extra mule teams behind in case of emergency. About 3 tons made a load. Twenty miles was a good day's travel.

Fight from Behind Wagons

"Camping places near good water and pasturage were chosen ahead by the scouts. Wagons kept together in groups of four. In case of attack by Comanche or Ute, the wagons wheeled into a circle for defense with men and beasts inside the extemporized kraal. Campfires were kept away from wagons to avoid giving target to foes. Blankets consisted of buffalo robes, and the rations 'hard tack,' pork and such game as the scouts and sharpshooters could bring down. A favorite trick of the Indian raiders was to wait till all animals were tethered out for pasturage, and then stampede mules and oxen.

In the confusion, wagons were overturned and looted.

"As the long white caravans came to their journey's end at Santa Fe, literally the whole Spanish and Indian population crowded to the plaza in front of the governor's palace. 'Los Americanos! Los Carros! La Caravana!' were the shouts ringing through the streets; and Santa Fe's perpetual siesta would be awakened to a week's fair or barter. Wagons were lined up at the custom's house; and the trader presented himself before the Spanish governor, trader and governor alike dressed in their best regimentals. Very fair, very soft-spoken, very profuse of compliments was the interview; but divested of profound bows and flowery compliments, it ended in the American paying \$500 a wagon or losing his goods. The goods were then bartered at a staggering advance. Plain broadcloth sold at \$25 a yard, linen at \$4 a yard, and the price on other goods was proportionate. Goods taken in exchange were hides, wool, gold and silver bullion, Indian blankets and precious stones.

"Travelers from Mexico to the outside world went by stage or private omnibus with outriders and guards and sharpshooters. Young Spanish girls sent east to school were accompanied by such a retinue of defenders, slaves and servants as might have attended a European monarch; and a whole bookful of stories could be written of adventures among the young Spanish nobility going out to see the world. The stage fare varied from \$160 to \$250 far as the Mississippi.

"In those days, gambling was the uni-

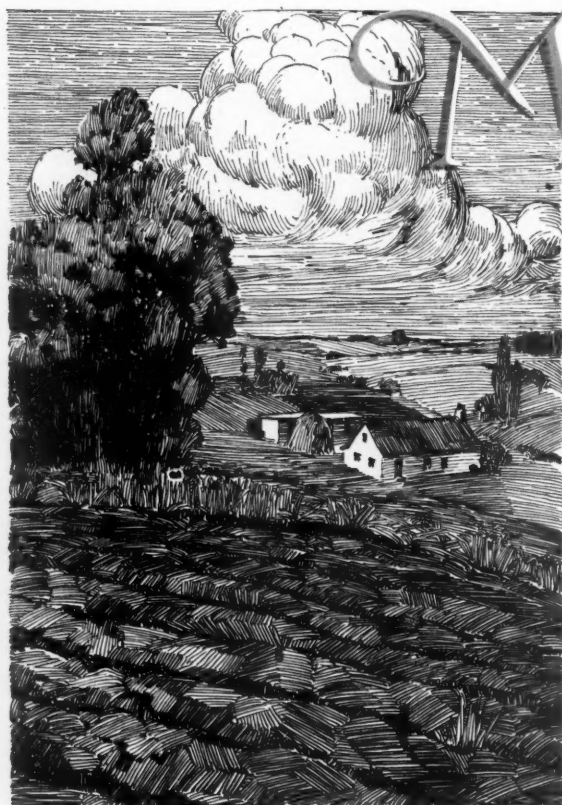
versal passion of high and low in New Mexico; and many a Spanish don and American trader, who had taken over tens of thousands in the barter of the caravan, wasted it over the gaming table before the dawn of next day. The Fonda, or Old Exchange Hotel, was the center of high play; but it may as well be acknowledged, the highest play of all, the wildest stakes were often laid in the governor's palace."

Mist of Romance Remains

The bullwhacker no longer cracks his whip over the plodding mules and horses; the scouts and outriders have patrolled the trail for the last time; the relentless Apache and Comanche have gone to the happy hunting ground of their fathers, but the mist of romance still hangs over the road to Santa Fe where the governor's palace and the Old Exchange Hotel serve as links to bind the past to the present.

On the Santa Fe trail, especially while traveling in Kansas, the motorist passes the isolated graves of soldiers, teamsters, scouts and trappers who gave up their lives that the west might be won; historic trees, buttes and forts where intrepid pioneers and hostile savages met in that century-long war for supremacy.

Take what one of the three routes you will, you can make no mistake. On each the sign posts point to pleasure and health. Horace Greeley's advice is as pertinent today as it was three score years ago and the "going west" is without the hardships that marked the journey in the days of the famous editor. Beyond the Mississippi the skies are of the rarest blue, the air is good to breath and the open road leads to vast storehouses of contentment.



Monarch of All

by J. C. Burton

Crowned now by the Spring with a chaplet of Joy,
I envy no king or czar;
I'm a bless'd potentate in my carriage of state,
A mud-splatter'd motor car.
My realm, it is boundless -to-day, it is Maine;
Tomorrow, the far Azores:
And in sunshine and rain I am hailed once again
As monarch of all outdoors.

Bold April's my jester and May is my queen;
My throne is the driver's seat:
And the steering wheel post is the scepter I boast
On highway and city street.

New Transcontinental Route Announced by Colorado

Pikes Peak Ocean-to-Ocean Highway Outlined

COLORADO SPRINGS, Colo., March 28—The Pikes Peak Ocean-to-Ocean highway is the latest development in the transcontinental route situation. The new highway was launched at a meeting in St. Joseph, Mo., on March 18, by the federation and alliance of state and interstate associations already in existence.

The course of the Pikes Peak Ocean-to-Ocean highway is from New York through Philadelphia, Washington, Baltimore, Cumberland, Wheeling, Columbus, Dayton, Indianapolis, Springfield, Ill., Hannibal, Mo., St. Joseph, Belleville, Kas., Colorado Springs, Glenwood Springs, Salt Lake City, Reno, Sacramento and Oakland to San Francisco.

The affiliating organizations are: Springfield-Hannibal Highway Association, through Illinois; Hannibal-St. Joseph Cross State Highway Association, through Missouri; Rock Island Highway Association, through Kansas; Lincoln Highway Association, through Colorado; Utah division of the Pikes Peak Ocean-to-Ocean Highway Association.

East of Illinois, a co-operative arrangement has been made with the National Old Trails Association, to Washington and New York. West of Salt Lake City the route is not finally determined but temporarily the line of the national Lincoln highway is to be used.

The entire route from ocean to ocean is passable today. It is claimed for this

transcontinental route that it is the central and most direct across the country. On the map it follows the same latitude and appears as nearly a straight line as the contour of the country will permit. It traverses sections of great commercial activity and agricultural diversity. It touches spots of great historic interest and many of its links are the twentieth century successors of the pioneer or Indian trails. It is the line of great scenic wonders, crossing the heart of the Rockies through Colorado's most famous section. Its crossing of the continental divide by Tennessee Pass at 10,400 feet is on a four per cent grade; and an alternative route is under construction via Independence Pass.

C. F. Adams of Chillicothe, Mo., was elected president of the Pikes Peak Ocean-to-Ocean Highway Association; A. Q. Miller of Belleville, Kas., first vice-president; George McIninch, St. Joseph, Mo., second vice-president; Edwin H. White, Springfield, Ill., third vice-president; A. W. Henderson, Colorado Springs, Colo., secretary and treasurer.

ILLINOIS PICKS GOOD ROADS DAY

Chicago, March 28—The second annual meeting of the Illinois Highway Improvement Association, which was organized largely through the efforts of the motorists, was held yesterday. William G. Edens of Chicago was re-elected president,

Thomas Sudduth of Springfield, treasurer, and Richard J. Finnegan of Chicago, secretary. The vice-president and directors were chosen from various parts of the state.

The banquet in the evening was remarkable in that it brought out many celebrities, including Governor Dunne of Illinois, and Speaker of the House McKinley. Warden T. J. Tynan, of the Colorado penitentiary, also was among the speakers. The governor announced that April 15 will be good roads day in the state, and urged that everyone become boosters for highway improvement.

COLORADO REGISTRATIONS SLOW

Denver, Colo., March 28—The renewal of state licenses for motor cars in Colorado for 1914 has been rather slow thus far, but the improved road conditions following the recent beginning of warm weather and the rapid disappearance of the exceptionally heavy snow are expected to bring in hundreds of registrations within the next few weeks. Secretary of State Pearce estimated today that about 7,000 licenses for 1914 have been taken out in all parts of the state. There were 13,500 in 1913, the first year of any state license law for motor vehicles in Colorado. Three thousand, eight hundred and ninety-five Denver cars are registered for this year, as against 4,700 last year. The total registrations probably will reach 10,000.

Outdoors

My fan bearers hail from the ends of the world,
They're winds from the oceans' shores;
And the white clouds above form the retinue of
The monarch of all outdoors.

The call of the road is the counsel I heed,
The only voice I obey;
I have banished Despair and the tyrant, dull Care,
From the realm where I hold sway.
I've made Speed my vassal and Distance my slave;
Miles past are my regal stores.
I can roam at my will, conquer desert and hill—
I'm monarch of all outdoors.



Touring Outlook for Season of 1914

TOURING should have a great vogue during 1914. The season's plans as they have been roughly outlined at this time are broad in their scope and are intended to arouse the 2,000,000 motorists in the United States to the joys of country driving. Organized efforts will be made by governing bodies to stir up interest generally and altogether this promises to be the greatest touring year we ever have experienced. The generally improved roads make traveling possible now where it was a hardship 5 years ago.

Great assistance is promised by both the American Automobile Association and the National Automobile Chamber of Commerce. The former is spreading the touring propaganda by scheduling a mid-summer meeting in the White mountains and offering every encouragement to the members of the A. A. A. to make this big camp their rendezvous early in the summer. As yet these plans have not fully matured, but they have been discussed and it is predicted that the affair will result in a general revival of interest in long distance touring. Motorists in all sections of the country will be invited to attend, and it looks as if many of them will.

National Touring Week Planned

More important still is the suggestion that we have a national touring week during the summer. This comes first from Alfred Reeves, general manager of the National Automobile Chamber of Commerce, as announced in *Motor Age* last week, but it now develops that the manufacturers are to co-operate with the American Automobile Association in the promotion of this new and novel feature. The idea undoubtedly came from the annual orphans' day outing, which was started nearly a decade ago and which now is a national institution. Each of the big cities and many of the smaller ones has its annual orphans' day.

It would be the same way with the national touring week. It would not be a big tour, such as the earlier Gliddens, but in the different sections of the country local tours would be put on during the week designated by the powers that be. For instance, the Cleveland Automobile Club could stage a 3-day tour for its members throughout Ohio. The Chicago Automobile Club and the Chicago Athletic As-

sociation could contest its annual inter-club team match at the same time; the Buffalo Automobile Club could chime in with a short tour. In other words, throughout the country that one week each community would strive to do something that would interest motorists in touring.

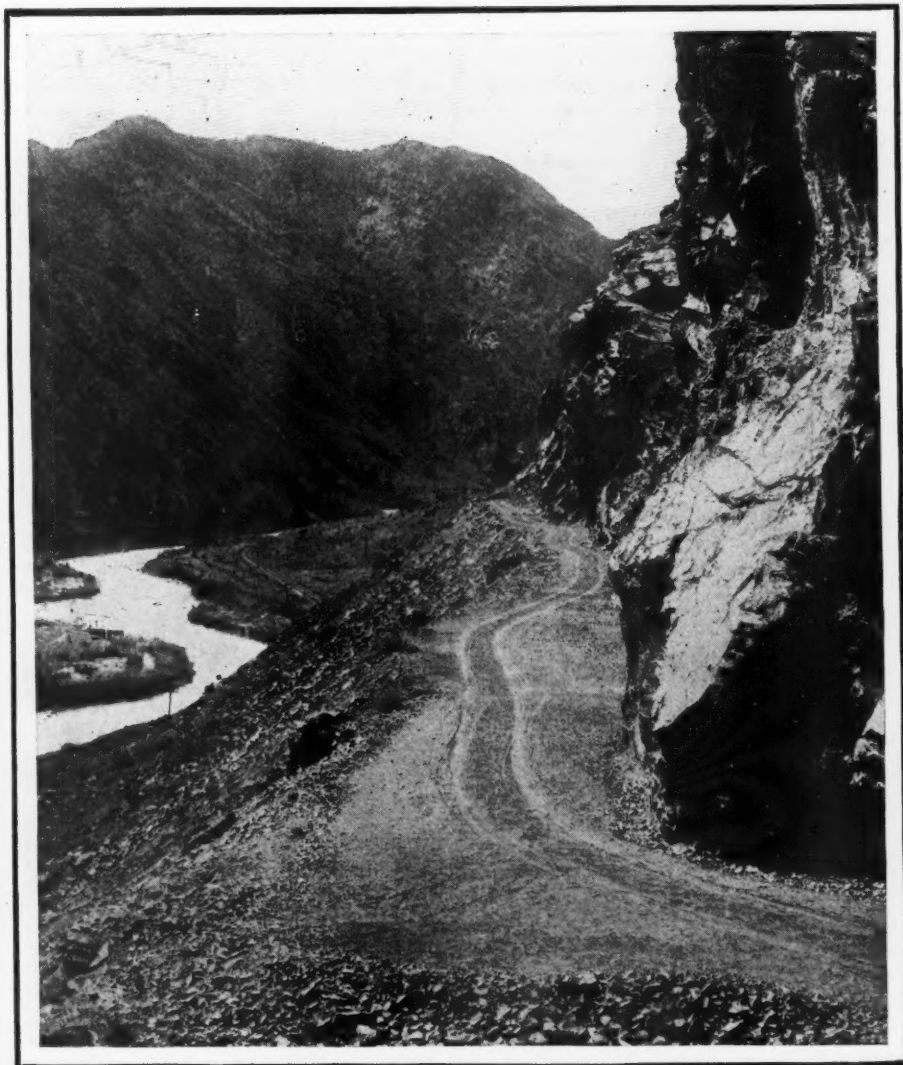
The support of the manufacturers has been the one thing needed to infuse new life into touring. Enthusiasm on the part of the dealers has been needed and now this can be obtained by the National Automobile Chamber of Commerce solicit-

ing the support of the various trade associations, urging them to help make the national touring week a success by means of mild contests in which prizes would attract the agents. On the other hand the American Automobile Association can help by gingering up the clubs and getting them to do something. With all forces pulling for the common good, touring will be a great institution during the season of 1914.

Chicago to Boston Run

Undoubtedly the slump of the once great Glidden has had its effect on touring enthusiasm, but now there promises to be a revival of this classic through the efforts of the Chicago Automobile Club, which has made formal application to the American Automobile Association for this trophy, which it wants for the chief prize in a day and night non-motor stop reliability from Chicago to Boston. In a way this is more of a contest than a tour, but it will have the effect of boosting touring, for it will attract many owners who are anxious to see if they can drive from Chicago to Boston without a motor stop.

This new idea as to the Glidden should



TYPICAL MOUNTAIN ROAD AS BUILT BY COLORADOANS

be received with more favor than the suggestion made through A. A. A. channels that the old cup be given to the member who drives the greatest distance to attend the White mountain meeting.

One regrets the decline of interest in the reliability run, for undoubtedly it has done more than its share in attracting the attention of the public to the joys of touring. While we have had so-called sociability runs in great numbers in recent years, still they lack the punch that the old time reliability had.

Outside of the events mentioned the general touring activities will be greater than ever. Many are planning long distance trips and while the transcontinental trails will not attract the motorists they will next year when the Panama exposition will be the lodestone to draw them to the Pacific coast, still the far west will be invaded by many.

In the east there should be more country traveling than ever before. The White mountain affair of course will be the trump card in this section, but with the many fine motor thoroughfares that criss-cross New England and the other eastern sections, there should be great activity on the part of owners.

Routes and Touring Information

Department Announcement

MMOTOR AGE'S Routes and Touring Information Department is a barometer which show clearly the development of this branch of motoring. Inaugurated 3 years ago for the purpose of supplying its readers with route information and to record the performances of those who enjoy traveling through the country, 200 inquiries were answered in 1911. The following year, 1912, this count was doubled, 400 readers being supplied with information which doubtless made it easier to go from point to point. In 1913 there also was an increase, 500 inquiries being answered through the columns of this department.

This, too, without the department being

maintained throughout the year. Naturally in the winter months there was not the demand for such information and Motor Age devoted the department to recording therein stories on touring that might tend to arouse enthusiasm.

The 1913 log book shows that Motor Age has well served its readers in this department. Outside of the route information contained therein, there has been published several notable articles describing the scenic beauties of this and other countries. Prominent among these was a series of four articles, written by John P. Dods, of the Automobile Blue Book, describing the wonders of a trip through the southwest, made under the auspices of the White Co. Doubtless this series of articles gave motorists more information concerning this land of the cliff dwellers than anything ever before written.

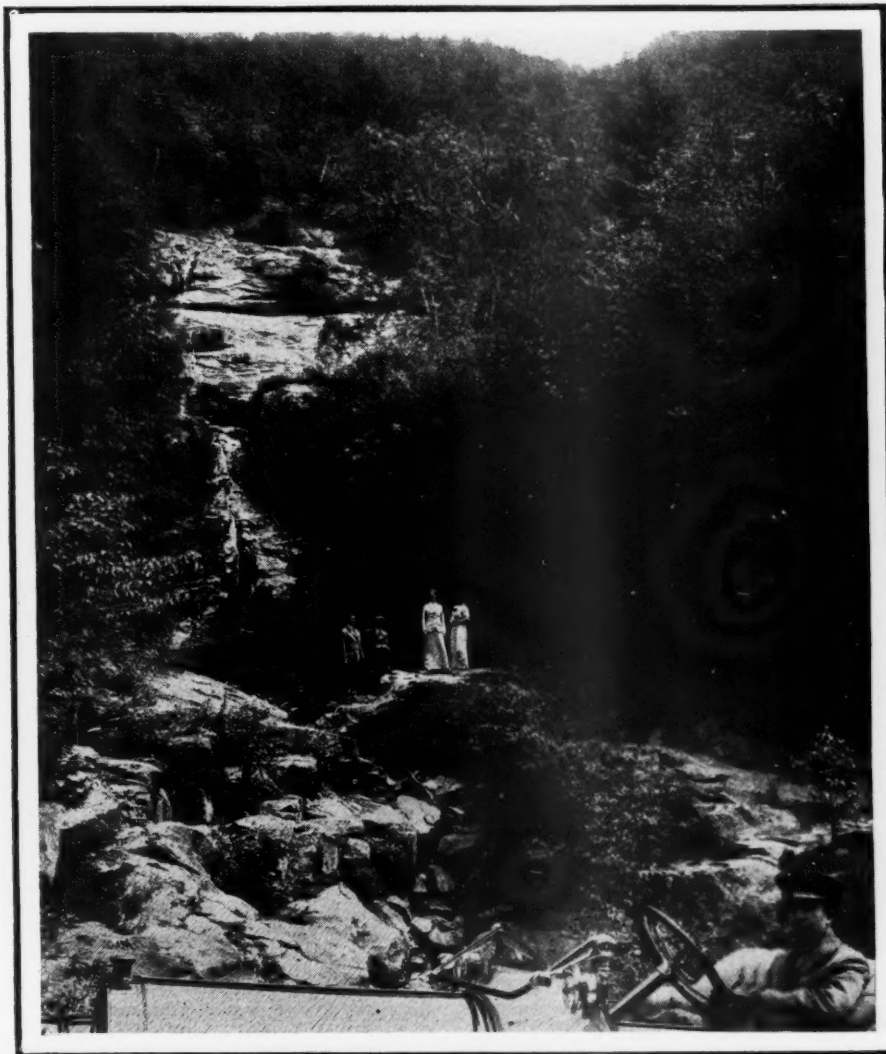
It is proposed to keep up this pace during 1914 and to do still better, if such be possible. In this present issue is an article of interest telling of the great transcontinental routes. The relief map of the western portion of this country gives one a clear idea of just how much work has been done by the good roads workers to make it easy to motor to the Pacific coast.

Uncle Sam—His Parks

Another article scheduled for the immediate future will tell of Uncle Sam's national parks. Hazily we imagine there are only four or five of them—Yellowstone, Yosemite, Glacier and Rainier. But there are more—twenty of them in fact, not including twenty-eight national monuments which really are of the same caliber as the national parks. Brought together in one article, one gets a graphic idea of just how much the government has done to preserve our scenic wonders.

Motor Age believes that nearly every motorist who takes a long tour has an interesting story to tell and therefore it invites its readers to help the good work along by sending in contributions.

In writing for information concerning routes, Motor Age readers are requested to use only one side of the paper, state their wants clearly and concisely and attach their signatures and addresses legibly. Any one not desiring his or her name attached to the communication as published in Motor Age may use a nom de plume; but in no case will attention be given the request unless it is properly signed.



SCENIC ATTRACTION FOR MOTORISTS IN THE WHITE MOUNTAINS

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The West as a Touring Ground

“WESTWARD” will be the watchword of touring until 1915 becomes history. The Panama-Pacific exposition is bound to exert its influence on the motorists, and the unseen grandeur of the Yellowstone, the Yosemite, the Grand Canyon, the mountains, the plains, the desert are calling to tens of thousands of motorists who have waited to see the unfolding of the interesting west from the seat of the motor car.

THE west, the central west and the southern west hold within their palm more of interest to the motorists than any other section of the country, perhaps any similar section of the world known to the motor tourists of today. The physical grandeur is ranked high with the wonders of the world; the spell of their vastness never fails to hold the tourist whose eyes behold it for the first time, and their accessibility today is making all of these hyper-attractions more of realities than ever before.

MOTOR AGE in its annual touring announcement in this issue points the finger of direction towards the Rockies, the Sierras, the Pacific and the national parks of the great west. Our relief map shows the highways over which the motor can be piloted in unlocking the wonders of these natural phenomena. Five outlined routes furnish access to the north, the middle west and the south, affording passable highways on some of them at least for all seasons of the year, although the most northerly one is only suitable for transcontinental travel a few months of the twelve.

TRUE, these five highways look more inviting on the map in red lines than many parts of them do in the motor car, particularly if in periods of incessant rains, snow storms or in the heat of mid-summer, but they are highways some of which are being well improved in many sections, and which afford ample facilities along the route to purchase gasoline and water, and afford good repair and garage facilities at the more important points enroute.

MUCH of the credit for these highways is due to local effort concentrated in road associations which have undertaken to improve sections of these highways, to post signboards along them, and to interest adjacent sections in similar highway philanthropy. Though much has been done, much remains to be done, so that on some of these roads it will be possible with a good degree of comfort to make the trip in dry weather and not run any more danger than in many other sections of the country.

WHAT is known as the Lincoln highway follows a route that has been traversed by hundreds in the past, and although its itinerary includes some desolate stretches of 70

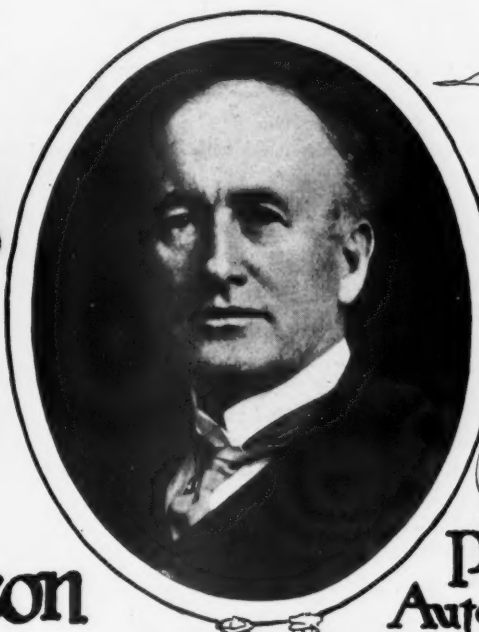


to 100 miles, there are not more than two or three of such, and progress is rapidly being pushed forward to rob these of the possibilities of danger that often threaten them. In these stretches more is needed than a good highway; namely, some form of route telephone, with stations every 5 or 10 miles along the roadside for the use of stranded tourists benighted by some unexpected breakdown, or halted for lack of fuel, because of illness or other incidents that come the way of the tourists. It is not utopian to conceive of completing arrangements with telephone or telegraph companies and arranging for the establishment of such depots, which by the payment of a nominal charge would place them at the disposal of the tourist, who could purchase a key or other means of permitting him to make use of any of such depots. Facilities of this nature would rob these desolate stretches of their horrors and do as much to increase the touring desire as road improvement.

IF the flood of tourists over the various transcontinental highways is as large in 1915 as many prophesy there will be other problems as large as making highways to be taken care of to insure rational touring comforts to all. It will call for adequate supplies of fuel at regular stations along these highways, and where large towns and cities are far apart the duty of seeing that adequate supplies are maintained becomes one that should be seriously considered by the different states, the different motor organizations and other associations along the route. Oil supplies must be adequate. Food supplies must be available. With a positive certainty of ample supplies in all of these lines, the tourist will start out with a much greater equanimity, and will get more enjoyment out of his trip than were he constantly beset with the thought of possible shortage in any of these. It is none too early to prepare for the motor migration stupendous to the Pacific coast in 1915.

LOCAL road organizations have done valiant services to signpost these highways, so that with few exceptions the tourist will not meet with difficulties so far as following the actual route; of greater concern to him will be the adequate policing of many stretches of the highways, which without doubt will be attractive fields for highway operators in busy touring seasons. These precautions belong to the different states where such stretches of highway exist, and are subjects that should be taken under consideration in advance. Speculative ones have suggested an aeroplane patrol service over such stretches, and those less optimistic on aerial travel have urged the motorcycle patrolman, who will be prepared to give personal protection and also assist tourists in emergencies. Such precautions will popularize touring immensely.

The Man at Helm of the National Ship of State



John A. Wilson

President American Automobile Association

HE'S president of the A. A. A. and cousin to the president of the U. S. A., and known from coast to coast as Uncle John. He signs his checks "John A. Wilson," admits that he is willing to try anything once and is a splendid example of the modern adage, "A man's only as old as he feels."

With his 60-odd years, tell-tale gold-rimmed spectacles and thin thatch of gray hair, he could play the kindly old father in the "Way Down East" or "Shore Acres" type of drama without a makeup, but he is as active and enthusiastic as the-world-is-mine college graduate about to tackle his first job.

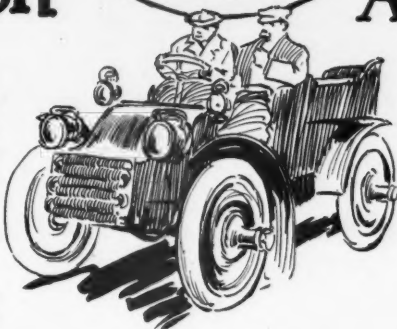
Fighter Who Never Quits

Like his cousin, Woodrow Wilson, he has the courage of his convictions and is ready to back them up for blood, money or marbles. He's a "fight it out on this line if it takes all summer" sort of battler. If he starts something he finishes it or takes the count. He eliminated the word "quit" from his dictionary when he was old enough to read.

The grand old man of motordom, the Moses of the American Automobile Association is Uncle John Wilson.

Your first impression of President John A. Wilson probably would be wrong. You'd take him for a vicar. You would be classifying him by the hat he wears—a flat-topped derby—and the kindly sparkle of his eyes. Uncle John is a motorist, a very enthusiastic motorist who glories in the great out-of-doors, works for good roads and believes in seeing America first.

He is more than a motorist. He is a sportsman. While a student at Princeton, where he was a member of the class of



'73, he played first base and center field on the baseball team. He was built for the two positions, being tall and with long arms and legs. Fourteen years after receiving his degree, he returned to the diamond, not as a player, but as an official.

"I was an umpire in the National league during the season of 1887," he said. "Uncle Nick Young wished the job on me. I've stood behind King Kelly and called balls and strikes for Charley Radbourne. I signed the best catcher that Anson ever had—Del Darling.

"I'm still a fan. I could sit all day on the top rail of a fence and watch eighteen kids play in the cow pasture."

Delights in Trap Shooting

There's another sport that appeals stronger to Uncle John than baseball, however. That sport is trap-shooting.

"I'd rather shoot at birds or saucers than eat," he declared. "For 23 years I've gone to Florida every season to shoot. I'm not a Roosevelt. I don't care for big game hunting."

We asked him when he first became interested in motoring. He thought a minute and then exclaimed:

"Lord knows! I guess I've had a car since the time they first started to make 'em. The first machine I had was a one-lung Packard that was built in Akron,

O. The first foredoor car that the Apperson boys ever turned out they sold to me and I've had an Apperson in my garage ever since."

Uncle John is not a stay-at-home motorist. He takes a tour every summer but never has invaded the west with his motor car. He goes where the going is good, through the Berkshire hills, among the picturesque lakes of New York and along the Atlantic seaboard. He proudly boasts of the fact that he has never explored Europe in a machine, although he has crossed the ocean seventy-two times.

"I haven't seen everything in my own country yet," he said. "Why should I bother about France and Switzerland and Germany?"

Strange Signal from Philadelphia

"I'm just back from a trip to England" and while I was there they showed me a sort of a land lighthouse. It was a tall tower placed at a cross road and signaled warnings at night. An acetylene gas tank provided the light and a tankfull is sufficient to keep the lighthouse in operation all summer. It doesn't need watching and it's just the thing to give the careless motorist a jolt and let him know when he is approaching a cross road.

"Fine thing," I said. "Just what we need in our own country. I never saw anything like it before. Where did it come from?"

"Philadelphia, U. S. A.," they told me."

"Didn't you give a trophy for a speed contest once," we asked him.

"Never," he snapped, and then added with a laugh, "I didn't have to; nobody won it."

We referred to the time when he offered to award a cup to the maker of the

stock car that covered a mile a minute in traveling in both directions of a course.

"Barney Oldfield was the only driver that attempted to make me buy such a trophy and he failed," the president of the A. A. A. explained. "The year before the first 500-mile race was run, he took a Knox touring car, put three passengers in it and made two attempts on the Indianapolis speedway to crowd a mile into a minute. He covered a mile in one direction in 1 minute and 11 seconds and came back in 1 minute and 13 seconds.

"I never had to buy that trophy and I don't think that I ever will. I convinced myself that a lot of fellows were lying or exaggerating when they talked about going 60 miles an hour. I got tired of hearing such hot-stove talk. That's why I made such an offer. I knew that there wasn't a stock car made that could do it."

Served on Contest Board

The presidency of the American Automobile Association, to which he was elected at the annual meeting in Richmond, Va., late last fall, is not the only office he has held in the national organization. He first served on the contest board under the late Samuel Butler and was then made a member of the executive committee. He was a vice-president of the A. A. A. in 1912, and the following year was first vice-president. He is also president of the Franklin Automobile Club of Franklin, Pa., and vice-president of the Pennsylvania Motor Federation.

Although he served as a member of the contest board and assisted in the framing of rules governing the speed events held in this country, Uncle John never has witnessed a road race or dirt track meet in his life.

"Racing never appealed to me," he declared, "and that's the reason I have never attended any such event. I am not against racing, however. Instead it is my wish to do everything in my power to foster the sport. I am not so narrow as to oppose a game which attracts hundreds of thousands annually and appeals so strongly to such a sportsman as Carl Fisher that he and his associates spent thousands to build such a speedway as that at Indianapolis.

Never Saw a Race

"Did I say I never saw a motor car race? That's not exactly true. I've seen them in the movies and they're great."

Uncle John, by the way, is a movie fan.

"There's something the matter with people that don't like the movies," is his opinion. "When I was abroad 2 months ago, I went to the Hippodrome in Paris and watched the pictures from 8 o'clock until midnight."

"The greatest good for the greatest number," is Uncle John's policy in conducting the affairs of the American Automobile Association. He aims to encourage the efforts of the local clubs and state organizations in their attempts to in-

fluence just legislation, better road conditions and promote contests. Under his leadership, the A. A. A. will concentrate its energies towards the improvement of national highways and the passage of uniform motor laws.

"In its campaign for good roads, the A. A. A. is not actuated by selfish motives," he declared. "The motorist always will find a good road. He'll drive 10 miles out of his way to find one. But the farmer, he's different. You've got to build the good road in front of his farm or he'll never get to it. We want good roads primarily for the farmer. We want to make it possible for him to use the roads 12 months of the year instead of 6, and haul twice as much to the market as he does now in half the time."

President Wilson of the A. A. A. is not an advocate of the "watchful waiting" policy of President Wilson of the U. S. A. He is a disciple of the "up and doing" school and this insures success for his administration.

KNIGHT PATENT GRANTED

Washington, D. C., March 26.—Under date of March 24, 1914, Charles Y. Knight has been granted the patent on his double-sleeve-valve engine for which he applied June, 4, 1906. The patent number is 1,090,991 and it is assigned to Knight & Kilbourne Patents Co., of Chicago, a corporation of Delaware. This is the second Knight engine patent to be allowed in this country. The first one was granted August 23, 1910, and covered a single reciprocating sleeve design. The design covered by the new patent is that employed by the present Knight engine.

This patent which puzzled the examiners for 8 years before finally being issued, also includes a system of lubrication specially designed to feed oil to the upper part of the sleeves. It has forty-three claims which cover the sleeve-valve action and the lubricating device. These cover the two reciprocating sleeves, their method of reciprocation, the ports within the sleeves, and the sealing of the combustion chamber by the junk ring.

CHANGES IN DETROIT CONCERN

Detroit, Mich., April 1.—Recent readjustments of the duties of the officers of the Hupp Motor Car Co. have been made public by J. Walter Drake, president of the concern. F. A. Harris, who was assistant general manager, has been made commercial manager with greatly increased duties, while C. D. Hastings, who up to this time has had the title of secretary and general manager, relinquishes the latter duties. He still is the secretary of the company besides acting in an advisory capacity. Later on in the summer he will take an extended foreign trip in the interest of the growing Hupmobile export business. Mr. Drake himself continues active supervision over the gen-

eral affairs of the company from the engineering organization of the Hupp company. Otto von Bachel, who for the past year has been concerned with the production of a small six, has withdrawn, following the decision of the concern not to enter the six-cylinder field.

FLECHTER STARTS SUIT

Buffalo, N. Y., March 31.—A suit was filed today in the United States district court by the Trenton Brass and Machine Co., Trenton, N. J., manufacturer of the Flechter carbureter, against J. B. Barclay, Inc., the Buffalo distributor of the Stromberg carbureter. The suit is for the alleged infringement of patent No. 1,041,708, granted October 15, 1912, to W. K. Anderson, now owned by the Trenton Brass and Machine Co.

It is claimed by the Flechter interests that the Stromberg company, after prosecuting two unsuccessful infringement suits against the Flechter carbureter, now has turned around and copied the features of construction of the Flechter carbureter covered by the Anderson patent, and it is stated that the suit is brought in Buffalo because the federal courts in Chicago and New York city are so crowded that it takes a year or two to bring a case on for trial.

STANDARD ROLLER BEARING REPORT

New York, April 1.—Special telegram.—There was a meeting of the creditors of the Standard Roller Bearing Co. at Philadelphia March 27 for the purpose of receiving a report from R. S. Woodward, Jr., and S. Lawrence Bodine, the receivers, at which it was proposed that a creditors' supervising committee of five be appointed with power to liquidate the concern at any time should such course seem desirable.

The general sentiment was to give the receivers a year to put the company on its feet. The receivers' report showed that the assets of the company have shrunk from \$6,101,107, as shown in the report of September 13, 1913, to \$1,831,432, this representing a shrinkage of \$4,269,675. This shrinkage is accounted for by marking off \$1,422,000 for patents and \$1,452,000 as reduction in the book value of machinery and tools.

According to the receivers' report given today, the quick assets of the company are \$792,000. The company owes approximately \$1,500,000 divided one-third to bond holders, one-third to banks and one-third to general creditors. According to the receivers' report the earnings for the last 3 months were \$25,000.

DEATH OF H. VON HERKOMER

New York, April 1.—Special telegram.—Cable advices from Europe today advise of the death of Herbert von Herkomer, who promoted the famous tour in 1907 in which 198 cars participated. He was 67 years of age.

America Runner-Up in World's Business Battle

Excelled Only by France in Value of Cars Exported

WASHINGTON, D. C., March 26—"All going out and nothing coming in," soon will be the condition of this country in the motor car foreign trade if the present tendency continues. This very hopeful outlook is the result of a statement issued by the Department of Commerce, which shows that motor car exports are steadily on the increase and imports are as steadily declining.

In the world's trade in motor vehicles, America is rapidly climbing to the front. The United States was fourth among the six nations in competition for the export trade 5 years ago; now it is second in the point of value of its motor car products shipped to foreign shores. France alone of all motor manufacturing countries surpasses us in exports and ours have been increasing eight times as rapidly as that of the French republic.

Exports Increase 600 Per cent

Returns of foreign trade compiled by the Bureau of Foreign and Domestic Commerce show the relative standing of the six countries in the motor car exporting trade. An analysis of these figures offer a comparison between 1908 and 1913, the figures covering the value of the motor car exports, including chassis, but omitting tires:

COUNTRY	1913	1908	Per Cent Increase
France	\$44,000,000	\$25,000,000	76
United States	35,000,000	5,000,000	600
Germany	20,000,000	3,000,000	566
United Kingdom	14,000,000	8,000,000	75
Italy	6,330,000	5,500,000	15
Belgium	6,000,000	2,000,000	200

Increased importance of the motor car as a factor in international trade is apparent from the statement in this report that the exports of this class from the six leading manufacturing countries now aggregate \$119,000,000 in value, an increase of \$10,000,000 over those of 1912 and \$70,000,000 over those in 1906. In this growing trade the United States occupies a prominent place, and it is believed sales in numerous parts of the world have resulted directly from the trade promotion service maintained by the bureau which, through the daily consular and trade reports, it is bringing to the notice of car manufacturers foreign trade opportunities.

Average valuation per car of those imported is considerably higher than that of those exported. Those imported during January were valued at about \$3,400 each, and those exported at about \$900 each. This average import price of \$3,400 is exclusive of transportation charges to our shores and duties collected, the ad valorem rate of duty assessed on cars valued at less than \$2,000 each being 30 per cent, and on all other cars 45 per cent.

Returns show an increase of 369 in the number of cars exported and a decrease of 59 in the number imported during the

month of January, 1914, when compared with January, 1913. The number of complete cars exported increased from 2,157 in January, 1913, to 2,526 in January of the current year; while the number imported fell during the same period from 71 to 12.

The record of motor car exportations from the United States began in July, 1901. In the 6 months from July 1 to December 31 of that year the total value of exportations was \$367,371; in the calendar year 1902, slightly more than \$1,000,000, and since that time has steadily increased until in 1913 the total had reached \$35,000,000, exclusive of tires and engines in sufficient quantity to bring the aggregate up to the high-record sum of \$41,000,000. Meantime imports which gradually increased from approximately \$500,000 in 1902 to \$5,000,000 in 1906, now show a downward trend, the total having receded to \$3,200,000 in 1908 and \$1,600,000 in 1913, with a proportionately much greater decline in the initial month of the current year.

American-made cars were sold last year in all parts of the world, considerable numbers going to the United Kingdom, Germany, and France, the European centers of the industry. To the United Kingdom our exports last year amounted to 5,152 cars, or more than three times as many as in 1910; to Germany, 1,017, or about ten times as many as in 1910; and to France, 921, or four times as many as in 1910. In each case the figures for 1913 were the largest on record. Canada continues to be the largest single customer for American cars, though the 6,051 cars exported thereto in 1913 is slightly less than the number exported to Canada in 1912, namely, 7,421 cars. In addition to \$8,000,000 worth of complete cars exported from the United State to Canada last year, about \$4,000,000 worth of parts also were shipped to be assembled in Canadian establishments. Sales of this class to Mexico declined from 297 cars in 1911 to 227 last year, while those to practically all other countries increased; those to South America having doubled, those to Australia and other British Oceania having increased about 50 per cent, and those to Asia, Africa, and other parts of the world as a whole having quadrupled during the last 2 years.

Imports Becoming Smaller

While American manufacturers were increasing their sales of motor cars abroad, foreign manufacturers were less successful in our own market. Thus the number of automobiles imported from France fell from 469 in 1912 to 196 last year; Italy from 109 to 85; and of those from the United Kingdom, from 137 to 54; while the number imported from all other coun-

tries except Germany decreased from 90 to 76. Germany alone showed increased sales, the 81 cars imported from that country in 1913 being a gain of 18 over the number in the preceding year.

Last year's imports into the United States were valued at slightly more than \$1,000,000, compared with similar imports of \$2,500,000 by Italy, \$3,000,000 by Belgium, \$3,300,000 by Germany, \$3,500,000 by France and \$18,000,000 by the United Kingdom. In tabular form the imports from the different countries to the United States for the last two years are as follows:

America's Imports of Foreign Cars

NUMBER OF CARS IMPORTED FROM	1913	1912	Per Cent Decrease
France	196	469	58
Italy	85	109	22
United Kingdom	54	137	60
Germany	81	63	gain 29
Other Countries	76	90	16
Total Number	492	868	42
Total Value	\$1,000,000	\$1,700,000	42

Figures have been compiled by the federal bureau of statistics showing the shipments of motor cars to the non-contiguous territories of the United States during certain periods. During January, last, 3 cars, valued at \$2,025, were shipped to Alaska, while none was shipped to that territory in January a year ago. The shipments for the 7 months' period ended January, increased from 5, valued at \$8,050, in 1913, to 19, valued at \$17,089, in 1914.

Shipments of cars to Hawaii increased from seventy-two, valued at \$151,492, in January, 1913, to 119, valued at \$128,945 in January last, while during the 7 months' period the shipments decreased from 411, valued at \$691,961 in 1913, to 337, valued at \$494,185 in 1914.

Thirty-eight cars, valued at \$43,031, were shipped to Porto Rico in January last, while during the same month of last year the number was forty-six, and the value \$55,221. During the 7 months' period the number decreased from 215, valued at \$264,576 in 1913, to 178, valued at \$211,337, in 1914.

American-built motor cars are becoming popular in the Philippines, for the returns show that the number shipped there increased from fifty-two, valued at \$49,465, in January, 1913, to eighty, valued at \$75,309, while during the 7 months' period the number increased from 271, valued at \$321,762 in 1913, to 418, valued at \$522,805 in 1914.

It is an interesting fact that dutiable imported motor cars remaining in bonded warehouse numbered ninety-two, valued at \$200,408, in January last, while in January a year ago the number was only sixty-three, and the value \$115,955. These figures lead to the belief that foreign cars are not selling so well in New York.

John Bull Preserves Early Models of Power

By S. W. Fowler Dixon

LONDON, March 12—Memories of pioneer motoring days were awakened at the Crystal Palace today, when the official transfer of the Motor Museum to this, its last resting place was announced by the Duke of Teck, chairman of the museum trustees.

This collection of historical motor cars and motorcycles is the same as that which Edmund Dangerfield collected for presentation in Oxford street, London, 2 years ago, but which, obviously, could not find a permanent home there. It passed from the public gaze, but Mr. Dangerfield had set his heart on preserving this sentimentally, though not intrinsically, valuable, collection, and resolved that it should not share the fate of his museum of antique cycles, some years previously, which had been scattered and lost. He, therefore, housed these old motors at his own expense until arrangements were made for them to be placed in that magnificent and gigantic glass house, the Crystal Palace, situated on Sydenham hill, some dozen miles from London. The machines are divided into two groups, and fill the Canadian court and the court of music, where they are picturesquely placed with small tablets in front of them giving their histories and principal points of interest.

American Cars Shown

Since being taken to the palace an addition has been made to the collection; this is a Foster steam wagon, built in America in 1901. It appears that it was staged in an exhibition at the Crystal Palace many years ago, and was taken by the palace authorities in lieu of rent. It lay in a shed until one of the engineering class, which studies at the palace, found it, and the machine then was put in order and used for demonstration to the students. Its span of usefulness having expired in this connection, it returned to its shed until the present occasion, when it was brought forth to find an honored place in the Motor Museum. There are also a Cleveland electric car made in 1900, and a White steamer—of 1901 vintage—both hailing from the U. S. A.

The oldest vehicle on view is Colonel Crompton's steam car, which was built in 1861. This vehicle Colonel Crompton, who, by the way, is now the consulting engineer to the British road board, used in India from 1868 to 1872 as an inspecting engine to follow up and watch the working of his other engines on the road; it ran a very considerable mileage and, on the whole, ignoring the fact that the constructor was plagued by broken crankshafts, worked very well.

There also is the first London motor cab, which was electrically-driven, and was built here in the year 1897. In the identical cab shown King Edward, then



OLD CARS PRESERVED IN MOTOR MUSEUM

In the upper illustration is shown the Crompton steam car, built in 1861 by Colonel R. E. Crompton. The center illustration is that of what is said to be the first cyclecar. It was built in 1900 and presented to the museum by Henry Sturmeny. In the lower illustration is shown the 1900 Wolseley and sent in by the Wolseley Tool and Motor Car Co.

Propelled Vehicles by Placing Them in Motor Museum

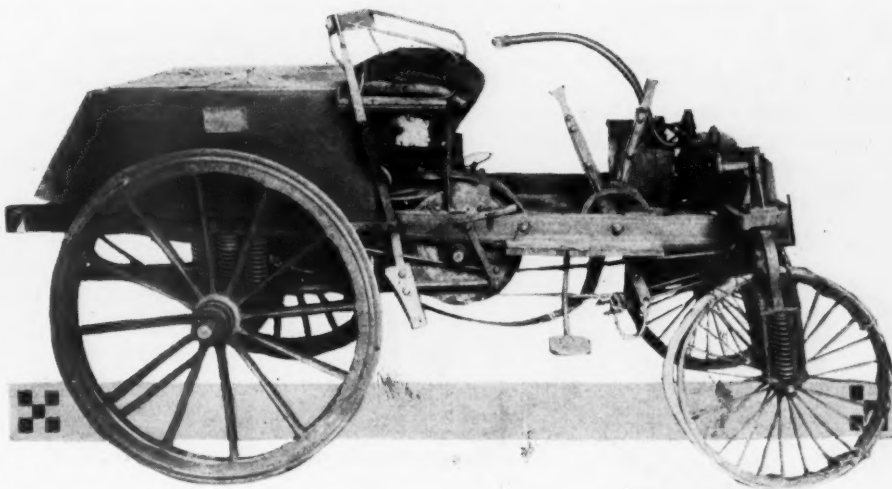
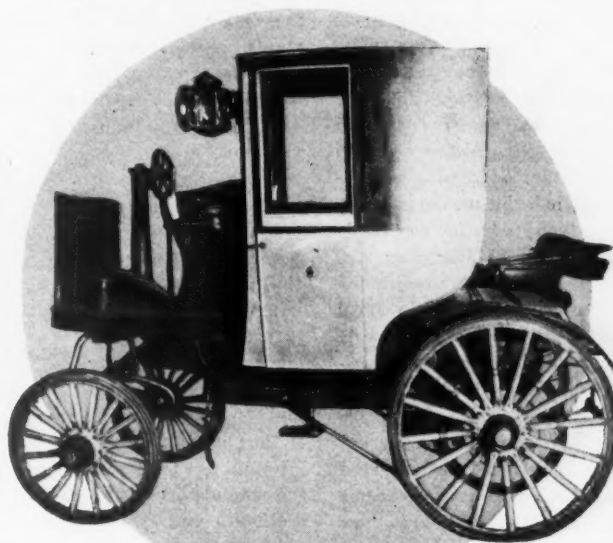
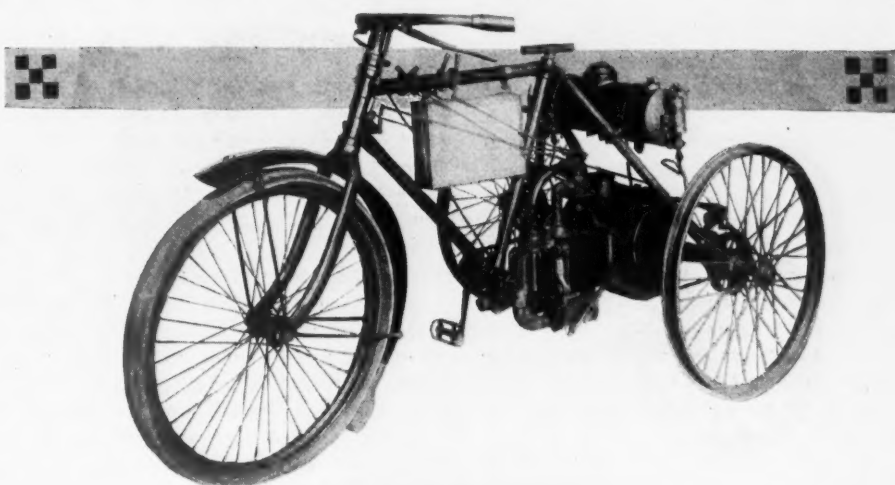
Prince of Wales, drove from Marlborough House to Buckingham Palace and back, in November, 1897, and doubtless had a very uncomfortable journey, for no pneumatic tire could be found in those days to carry the weight of the vehicle.

It is interesting to note that some of these ancient models embody features which are prominent in the most up-to-date vehicles of the present time. Thus there is a self-starter on the Delahaye car built in 1901; the section Albion car, which was constructed in 1900, has two little coil springs between the tappets and the valve spindles to insure silent working; a Wolseley, which dates back to 1895, employs a gate change-speed control; the prototype of many modern shock absorbers may be seen on the paraffin car, constructed by John Henry Knight in 1895, and the Holden four-cylinder motor bicycle, 1895 model, is said to be the earliest example of the application of a four-cylinder gasoline engine to a road vehicle of any description, and also one of the earliest examples of the use of high-tension ignition with a high-tension distributor. There also is a Bollée triecyle with swivelling head lamps.

First Cyclecar Exhibited

That the cyclecar movement is not new is also proved by the fact that Henry Sturmev shows a little vehicle which he built in the year 1900, to sell at \$500 or less. The engine, which is air-cooled, is of $2\frac{3}{4}$ horsepower driving through a three-speed gear which led up to the invention of the Sturmev-Archer three-speed gear so widely used on pedal cycles today. The body was of basket work, and the steering was effected by what were frankly bicycle handlebars. The little car did 15 miles per hour, and would take a 1 in 8 gradient on its first speed, but then had to stop to cool the engine which got so hot that it went on firing when the spark was switched off.

The London correspondent of Motor Age also is among the donors, having on view the racing triecyle, built by the now famous aviator, Eugène Renaux. That clever young engineer built his triecyle in 1899 and, on July 20 of that year, won the Paris to St. Malo race, covering the journey in 7 hours 11 minutes, a speed of 32.2 miles per hour. The machine was used in England until half a dozen years ago, when two experiences caused it to be relinquished. The first was that, through jacking one of the back wheels up and running the engine excessively on the stand, the axle twisted and snapped one day while traveling along the road, fortunately without personal injury; the second was that the carbureter, flooding on to the hot engine, caused a conflagration, which consumed all the inflammable parts of the machine and much of the clothing of your correspondent.



RELICS OF EARLY ENGLISH INDUSTRY

The upper illustration shows a Renaux triecyle built in 1899 and presented to the museum by S. W. Fowler Dixon. The center illustration is the first London taxicab, built in 1897 and presented by W. C. Bersey. The lower illustration is the J. H. Knight car, built at Farnham in 1895 and contributed by John Henry Knight, of Farnham

Hasty Fender Ordinances May Work Useless Hardship

Safety Guards for Trucks Not Yet a Success

LAUDABLE as the "Safety First" campaign is in its general purpose and ordinary applications, it has led, in one of its aspects at least, to hasty and ill-advised regulations that are a source of expense and annoyance without any compensating good. The agitation against street accidents by motor cars led to the passage of ordinances in Chicago and Detroit last year requiring the attachment of safety fenders to motor trucks. Other cities are considering the same question. This is of interest to pleasure car owners as well as truck makers and users for some municipalities are considering the application of the ordinances to pleasure cars too.

There is no doubt that practicable means of reducing accidents to pedestrians would be accepted by the motoring fraternity at large and the truck interests in particular, but it is doubtful whether any means of guarding the front end of the car alone would give the results hoped for. An aldermanic committee in Milwaukee to which a proposed fender ordinance was referred, promptly killed the measure when an investigation of the coroner's records made by the Stegeman Motor Car Co. showed that none of the accidents for which motor trucks were responsible could have been prevented by the use of fenders, because in every case the victims fell between the front and rear wheels.

Pleasure Cars Also

That such measures, were they once enforced on motor trucks would be extended ultimately to passenger cars as well, seems probable if the Milwaukee figures are borne out by the statistics of other cities. The Stegeman company in the investigation referred to also showed that according to the coroner's records, only 10 per cent of the motor vehicle fatalities and injuries were caused by motor trucks; that ten times as many were caused by passenger cars and motorcycles.

So far, nothing that has been done in the way of city ordinances has been of any value, and in the case of Detroit has resulted in expense and annoyance to the makers and users of commercial vehicles. An investigation has been made among

By Darwin S. Hatch

truck makers and users in Detroit and truck dealers in Chicago by the National Automobile Chamber of Commerce to find out how the ordinances in those cities are working and what is the consensus of opinion as to the practicability of using fenders on trucks.

Present Ones Not Inforced

Out of more than a score of responses to inquiries, not one is favorable to the use of fenders; on the contrary, they are almost unanimous in pointing out the uselessness of such devices and the probable increase of accidents that would result from their use. Both the Chicago and Detroit ordinances were passed hastily and were to become effective in a few months after passage, notwithstanding there was not in the market any fender that had been proved effective or that could be produced in sufficient numbers within the allotted time to equip all the trucks in service.

As a consequence, the Chicago ordinance is not being enforced and truck dealers and users have not been notified to comply with it, but a traffic commission is to study the whole question of street congestion and accidents and recommend relief measures. In Detroit, the users of trucks have attempted to comply with the ordinance, but the police commissioner extended the date of enforcement from November last to January 1 because no type of fender had won his approval. The commissioner says that up to date there has been no perceptible falling off in the number of accidents as a result of fitting trucks with fenders. The general impression prevails among truck people in Detroit that the ordinance will be rescinded or revised after a few months's experience with its working.

Fender Laws

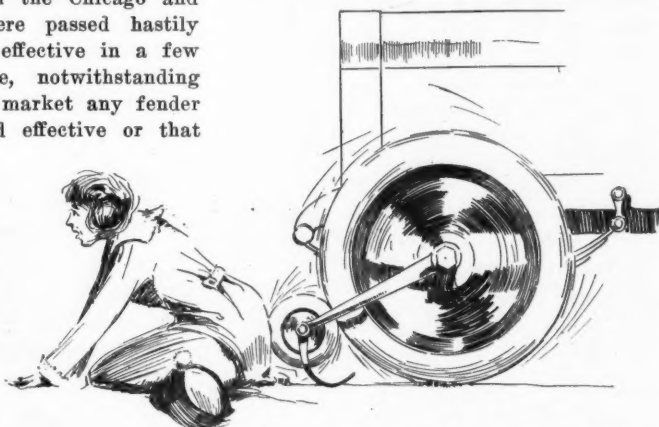
The Chicago ordinance reads as follows:

Section 2650 1/2. It shall be unlawful for any person, firm or corporation to use and operate in the City of Chicago any auto car or truck for the purpose of conveying therein bundle, parcels, baggage

or wares, merchandise or other similar articles, unless said auto truck or car is provided with a fender as in the case of street cars operated and used within said city, or such design as may be approved by the board of inspectors of public vehicles.

The Detroit ordinance provides a fine of from \$10 to \$100 for every day's operation of a vehicle that violates the following provision and also provides that the offender may be imprisoned in the House of Correction for not more than 90 days for each offense:

Sec. 1. That all persons, firms or corporations now and hereafter owning or operating motor vehicle trucks of one ton capacity or more in the City of Detroit shall provide all their cars now or hereafter in use with fenders designed to catch and sustain any human being who may be in the way of such car, and so mechanically constructed that such



THE MOST PROMISING DEVICE, BUT FAR FROM SATISFACTORY, IS A RUBBER TIRED WHEEL ROTATING OUTWARD

fenders may be lowered or raised by the operator in charge of said motor vehicle truck or such other fenders as may be deemed best to carry out the intent of this ordinance, such fenders to be of such design as the Police Commission shall have certified in writing meet with their approval.

Sec. 2. It shall be the duty of the Police Commission to examine and pass upon all designs of such fenders submitted to them by any person, firm or corporation owning or operating any motor vehicle truck within the City of Detroit and give written certificate to such applicant of his approval or disapproval of such designs.

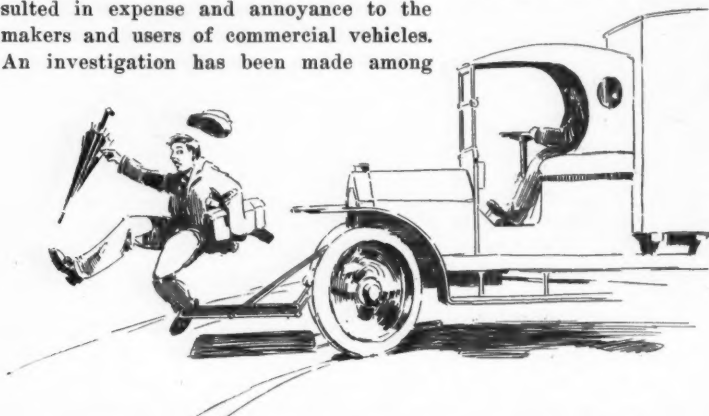
Chief Objections to Fenders

The principal criticisms against the use of fenders in the report of the Automobile Chamber of Commerce are that:

- 1—They are as likely to cause injuries and death as to prevent them.
- 2—They add to traffic confusion.
- 3—They become damaged and inoperative.
- 4—No satisfactory and effective type of fender is known to truck makers and users.

5—There is no more need for using fenders on motor trucks than on automobiles, motorcycles and wagons.

The coroner in Chicago has shown by a recent analysis of the records of street accidents in Cook county and the number of horse-drawn and power vehicles, that the motor vehicle causes only half as many deaths as horse-drawn vehicles in



A FRONT FENDER ADDS TO DANGER AND IS LIKELY TO BE TRIPPED OVER BY THE UNWARY PEDESTRIAN

relation to the number of miles traveled. So it is evident that it is more necessary to fit fenders in front of teams than to the front of motor trucks.

Cleveland Ordinance Pigeonholed

The ordinance offered in Cleveland was pigeonholed in committee during the winter after presentation of the facts regarding the impracticability of fenders on trucks. A number of truck makers and dealers hold that fenders are not only impractical and inefficient, but are a positive source of increased danger. They project about 2 feet in front of the vehicle and below the line of vision, where they are likely to strike and trip a person on foot, especially when the truck is making the turn at street corners. At such times the outer corner of the fender swings far out beyond the curve described by the outer front wheel like the step on the long vestibule street cars, and the driver of the truck cannot watch the fender and also look where he is going so as to avoid persons on the inside of the turn. In some makes of trucks, the corner of the fender would be 11 feet from the driver, and largely concealed from his sight by the hood, radiator and mud guards. Unless the fender were made much wider than the overall width of the truck, it would not prevent a person being struck by the inner front wheel at street corners, owing to the angle at which the wheels are turned on the axles.

Fenders that have to be lowered to prevent accident are said to be ineffective because the driver must concentrate his attention on the steering wheel, clutch and brakes. Both hands and both feet are engaged when he is trying to avoid striking a pedestrian, so there is no time to lower the fender. Yet fenders must be built so that in ordinary use they have several inches clearance above the ground or they will strike constantly when going over rough roads, car crossings and bad pavements. In Detroit, the drivers often forget to raise the lower part of the fender and it strikes something and is broken. Many trucks are running with broken fenders tied up with cord or wire so that they cannot be lowered from the seat.

If the fender is from 3 to 6 inches from the pavement, it is more likely to drag a prostrate body underneath the truck than to pick it up. Furthermore, the edge of the fender is likely to break the ankles or legs of any person whom it strikes in a standing position.

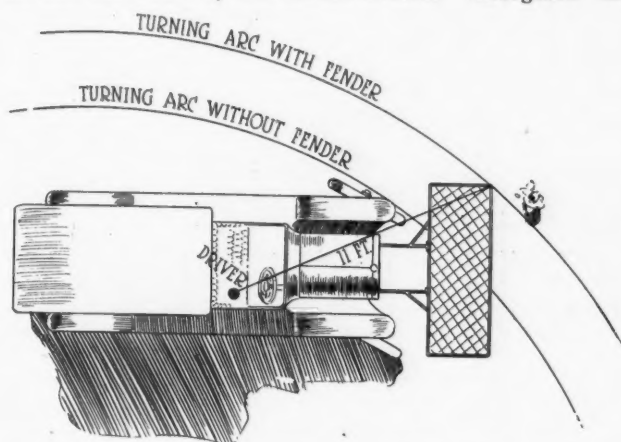
Many of the deaths and injuries resulting from collision with motor trucks are due to the shock of impact with some part of the vehicle rather than to being run over by the wheels. Fenders will increase the number and severity of such injuries by knocking the feet from under pedestrians and throwing them heavily against the front of the machine.

Various other objections to fenders have been cited, all tending to the conclusion

that the use of such devices on motor trucks will not only fail to accomplish the desired result to the extent that they do on street cars operating on rails, but that they will increase the dangers of street traffic and be a prolific source of annoyance.

The Pierce-Arrow company has gotten out a booklet presenting arguments gathered by its engineering department for and against the use of the fender on trucks, taken from a paper read before the Society of Automobile Engineers and the National Automobile Chamber of Commerce. The statement is made that "we individually and collectively would welcome a fender which would actually save life, provided that such a fender were made in a sound, workmanlike manner, of sound engineering design, capable of being easily applied, of being maintained in good repair easily, and at low cost."

The booklet gives the results of tests made in 1908 by the public service commission of New York on street car fenders and tests made by the London General



INCREASED DANGER TO PEDESTRIANS AND GREATER STREET SPACE REQUIRED WITH FENDER

Omnibus Co., which, out of 4,700 replies to its advertisements for a fender, did not find one that it could adopt with benefit. Inasmuch as this company runs 3,000 buses through congested traffic, its damage claims are such that it is very earnest in its search for a real life-saver. The most promising device, but far from satisfactory, is a rubber-tired wheel in front rotating out instead of in.

MORE MORA COMPLICATIONS

Cleveland, O., March 30—The Kinsey Mfg. Co., Pittsfield Spark Coil Co. and the Baldwin Chain Co., creditors, have filed a petition in the United States district court, alleging the Mora Power Wagon Co. is bankrupt. William Rothenberg is attorney for the petitioners.

The Mora Power Wagon Co. was thrown into bankruptcy some weeks ago on the petition of Frank Adams, treasurer of the company. Adjudication was entered and Frank Adams appointed receiver, but when Samuel H. Mora, president of the company filed a petition with Federal

Judge W. L. Day, alleging that he had not been properly served with court papers, the receivership was set aside, but the adjudication was allowed to stand. Mr. Mora has been in charge of the concern's affairs since the receivership was set aside. The new petition in bankruptcy serves to complicate the case still more.

BONNELL MAKES A CHANGE

New York, March 28—H. A. Bonnell, assistant general manager of the National Automobile Chamber of Commerce, Inc., has resigned to accept the secretaryship of the Manufacturers' and Dealers' Motor Underwriters, 80 Maiden Lane, New York city, an organization recently formed by a number of large motor car manufacturers and others prominent in the automobile industry to handle all kinds of motor car insurance. Mr. Bonnell takes up his new secretaryship work immediately.

The Manufacturers' and Dealers' Motor Underwriters has in view establishing arrangements with all motor car dealers throughout the country whereby these dealers can write insurance policies on the cars sold by them. The plan will be to approve of dealers in different cities who shall be deemed eligible to handle such work and the dealer will receive a satisfactory commission for his insurance services. The Manufacturers' and Dealers' Motor Underwriters will not carry the insurance themselves but will place it with standard insurance companies now in existence.

Mr. Bonnell has been actively identified with the motor industry for a number of years. He was manager of the Automobile Board of Trade until it was merged into the present National Automobile Chamber of Commerce. He has been treasurer of the American Automobile Association for a number of years.

CHANDLER DECLARES DIVIDEND

Cleveland, O., March 28—At the regular monthly meeting of the board of directors of the Chandler Motor Car Co., the second dividend on the preferred stock of \$200,000 was authorized. This stock carries a 7 per cent cumulative dividend, and the declaration of the second dividend completes payment of earnings on this stock since the beginning of the organization of the company, July 1, last year.

GRAY AND DAVIS DECLARE DIVIDEND

Boston, Mass., March 28—The directors of Gray & Davis, Inc., have declared a quarterly dividend of 1¼ per cent on the preferred stock of this company, payable April 1.

'Round the World With Kerosene as a Motor Fuel

Part II—Through France, Belgium and Holland

By Edwin P. Kohl

"J E ne parle Francais"

was all we could say to the French customs officials when we arrived in Boulogne after crossing the English Channel from Folkestone; but the Royal Automobile Club, of which we, King George V of England and other notables are members, had looked after most of the preliminaries for us from London, so we did not have to send back to the university for our French grammar. Among the requisites for making a motoring trip into a foreign country are the securing of an international pass and triptyques.

Foreign Motoring Made Easy

The former is the outcome of an agreement among the countries of the old world whereby the registration and number of one country are recognized for its tourists in the others by arrangement in the home country before departure. This saves motorists the inconvenience, delay and expense of securing separate markers



Waiting for the ferry boat across the Rhine, between Antwerp and Rotterdam. Typical Dutch boys in the foreground

EDITOR'S NOTE.—This is the second article in the series by Mr. Kohl, who is making an around-the-world tour in a kerosene-driven Henderson roadster. The first article, published in the March 12 issue of *Motor Age*, was a description of a motor migration through the British Isles. The third installment will be published in an early number.

The amount of customs for each country to be visited is computed and deposited before departure instead of being paid at each frontier. It may be added that this amount is refunded on departure from the country; otherwise we might have to mortgage the car and all our personal

the chauffeur, evidently because our mustache had not begun to curl at the ends yet. The French customs provisions allow only two spare tires to be carried without paying extra duty, but we convinced the officer with the waxed mustache that the rear left casing would blow out the next morning, leaving us with only the specified

two "spares," so we got by. The officials were in a dilemma as to how to classify the four spare leather treads, but while they were consulting, we asked a man near to write us how the debate came out after we crossed the French border and took "French leave." Probably the question is before the French congress by this time.

On arriving at a garage, it took us about an hour to convince the attendant that we wanted kerosene, not gasoline, for our car. In England kerosene is paraffine, while gasoline is called petrol. On the continent, again, our kerosene is called petrol and our gasoline goes under the name of essence. After the alteration of names, it is peculiar that we did not finally call for Spearmint for fuel. We finally drained a little kerosene from the carbureter and rubbed it on the Frenchman's nose until he was convinced. After a few "Mon Dieu's" and "Sapristi's," he supplied us as desired. Fuel is very high in France because of the government tax thereon. Even in the coast towns, where it could be cheaply shipped from America or Russia in tank steamers, we paid an average of 35 cents a gallon for kerosene and 55 cents a gallon for priming gasoline.

Across Northwest France

With the car put to bed, we began to look for one ourselves. When we tried to ask for one, however, we were given a beer. Of course, that could not be wasted, with due regards to the bar maid. Finally, we obtained a "chambre" at a "pension." We obtained breakfast by making the proper (or improper) motion and hurried down to the garage to change a pneu (tire). Then the throttle was opened on the National road, built by Napoleon, and we headed in a northeastern direction.

Our plan was to traverse the northwest of France, enter Belgium and cross the Netherlands into Germany. This gave us the opportunity of getting into every country we desired, at the same time



Passing through the streets of Ostend, Belgium, where in 1854 was made the "Manifesto" carrying the suggestion that the United States take Cuba by force to prevent it from being Africanized like Hayti

for each country visited. Our "G. B." from Great Britain will serve us for the balance of our trip around the world until we arrive in San Francisco in 1915.

"Triptyques" are special customs papers arranged for and paid at the point of departure for a foreign country—in our case, in London—with a motoring club.

effects before getting around the world. The total for the countries of Europe which we intend to visit was about \$1,200.

At Boulogne we had our first taste of the foreign customs officials of which returning tourists from Europe had told us. We had difficulty in convincing the inspector that we were the owner and not

offering us a wide variety of scenery and places of interest. We were so well satisfied with our thorough tour of the British Isles that we decided to "do" the rest of the important European countries with the same completeness instead of making a bee line for Indianapolis, east.

The weather at this season was ideal. The air was warm, yet bracing. The country had begun to put on its autumn clothes, which lent rather a festive appearance. The ocean or the gulf stream seems to have a moderating influence on this part of Europe and prevents the winters from becoming very cold or the summers too hot. For motoring, this season seemed most satisfactory to us, in spite of the fact that the touring season is supposed to end in September. At any rate, we were thankful that we were not yet in Siberia even though it was not "Apple Blossom Time in Normandy." We cheerfully accepted "The Chimes of Normandy" from a nearby cathedral as a substitute and headed the roadster towards Calais. Whenever we passed a guide-post, we shut our eyes for fear in trying to decipher the French, we should get the wrong direction. The roads were smooth as a table and, unlike the English roads, very straight. We shall not attempt to recapitulate the names of the towns through which we passed.

Postpone Trip to Paris

As we intended to enter France again from the east after traversing Germany and Austria, we did not go down to Paris in spite of our craving to discover if the gay capital was such a rendezvous of wine, women and song as we had read in the story books. We thought it wiser to utilize the splendid fall weather in seeing the country. That seemed to be the roadster's desire too, for it took to the French roads like a native car.

The French drive like demons on their boulevard-like roads which seemed to touch the Henderson's national pride and it took upon itself the habit of setting the pace. But the country was too picturesque to drive through it fast, so we made the kerosene mixture thin and took our time. To the speeding Frenchmen, the passing lakes, vegetation and animals must all look like vegetable soup. One night we gave the car a treat by placing it next to a Peugeot in a garage, where the two discussed the last Indianapolis 500-mile race which a brother of the latter won.

"Arrete!" shouted a half dozen gendarmes at us as we passed a certain fort-like building, and we knew the French border had

been reached. After the usual display of brass buttons and our papers, we were allowed to pass on into Belgium. But no sooner had we remarked that the Belgium air worked the same in our kerosene carbureter mixture as did the French and English, than we were again stopped by the Belgian frontier guard who made us repeat the vaudeville act which we had just staged for the French. We charged no admission, but in turn were taxed an extra 2 francs police fee with which the guard no doubt bought mustache wax.

In Belgium, about half a dozen languages are spoken and all notices are posted in both French and Flemish. Fortunately, however, the name for kerosene remained the same while the price dropped

over, we passed on to historic Brussels.

The capital of the Belgians is rather an attractive city with its boulevards surrounding the central section and its large public square. It seems to make an attempt to imitate Paris in its gayety. Its principal streets seem to be occupied with chairs in front of beer halls while the people walk in the street. In klaxoning our way through, it hurt us to see the drinkers, evidently shocked at the harsh note, spill the precious Pilsener on their shirt fronts. We, on the other hand, were more exacting where we spilled ours. One who does not drink here is pitied like a man with a hare-lip, and we did not want sympathy.

Admirers of Napoleon, we took a short



"Alexander's Ragtime Band," played by a hurdy-gurdy in Ghent, Belgium, makes the world's tourists homesick for the land of the rag and the home of the cabaret

to 19 cents a gallon. The altitude dropped proportionately, for most of Belgium is flat near the sea-level, like Holland. What we saved in hill-climbing, we paid for doubly in cobble-stone roads which cover this section of Europe for hundreds of miles, but with good springs and upholstery, double shock-absorbers and over-size tires, we minimized our swear-words to four a mile. We were told to avoid this section of the country but we wanted to see the international exposition at Ghent. After giving the fair the once

run of a dozen miles from Brussels to the battlefield of Waterloo. After being told by the guide (at 5 centimes a word) of the last charge, we shouted, "Vive l'Empereur," and started for Antwerp. As we passed along the solid cobblestone road, we could not help but think that if Napoleon could have had his heavy cannon, mounted on Henderson roadsters, moving on such roads as these on that fateful wet morning, St. Helena might now be as unknown in history as Xenia, Ohio.



Waiting for a slow-moving canal boat to pass through an open bridge of a Dutch canal near Rotterdam

After depositing a few golden with the American Petroleum Co., at this shipping metropolis of Belgium, we began to get our papers ready for the Netherland's frontier which was soon reached. Wooden shoes, wide pantaloons, canals and windmills now became as numerous as Ethiopians in Indianapolis. Our road

often skirted the canals for miles which gave us a good opportunity of observing the transportation methods of the Dutch. Several women often were seen towing a large canal boat from along the bank. This may not be as rapid and pleasurable a method of getting about Holland as in a motor car, but undoubtedly it is cheaper.

Habits of the Dutch

The Dutch seem to be a very cleanly people for every building, outside and in, glistens from the repeated scrubbing and polishing. Probably the large amount of water about them facilitates this. Our mud-spattered world-girdler, which had not had a good wash since it left the factory, looked rather out of place in these environments. We did not set an "Old Dutch Cleanser" at work on it on that account, however, for we thought that perhaps a dike might break during our sojourn and save us the expense. We did not feel very charitably towards the dikes of Holland when we had to learn the "Tis a leak in the dike and he's only a boy" poem, but as we behold only them between us and millions of tons of salt in solution, we thanked the Dutch for their forethought.

But passing from below sea level by the dikes to higher things, we desired to see the Peace Palace at The Hague, so chugged up there, passing Rotterdam and other curse-words on the way. But, lo! the place had disappeared from the map. After stopping by the roadside for an hour and studying the map, we decided that we had been indulging too freely in Dutch kare-killer and were about to go direct to Berlin without seeing the big cote of the dove of peace; but a pair of wooden shoes out of which protruded a typical Dutchman pointed his finger to Gravenhage on the map and said "Doot eest." The Hague seems to be merely our English version of the city's name.

Entertained at The Hague

Although Andrew Carnegie was not present to give us an official welcome, "a good time was had," as the country news item would put it. Certain motorists at The Hague took offense at the fact that the printing on our hood of the car stated "Via England, Germany, France, Italy, Russia, India," etc., thus omitting one of the greatest nations, Holland. We assured them that we would give the matter earnest consideration. In the meantime, we would enter the country in our expense account where all countries insisted on being represented to our sorrow.

"Die Wanderlust," which had driven us from loving hearts and true at home, was again attacking us even though this was the fourth nation we had visited in as many weeks. We turned our headlights towards das Harz Gebirge and before evening, we were in Emmerich in das Deutsche Vaterland, eager to see all the sights.

Renault Direct Drive Patent Expires

Frenchman Makes Fortune Out of Royalties

PARIS, March 21—Louis Renault's direct drive patents have become public property during the past few days. In 1904, when practically all cars had chain or other indirect system, Louis Renault was granted a patent for the now universally adopted system of direct transmission of power from the motor to rear axle. In 1905 the validity of the patent was upheld by the Paris supreme court of appeal, and since that date practically all French manufacturers have paid royalty to Renault. A few refused to recognize the patent, but a recent decision of the courts is in favor of Renault, and these firms have been ordered to pay on all their past construction.

The direct drive royalty appears to have been a variable quantity. While many firms paid 1/2 per cent of the chassis price, others made an early arrangement whereby a fixed sum was paid annually, whatever the number of cars built. It is estimated that of recent years Louis Renault's revenue from the direct drive patent has been not less than \$200,000 per annum. No attempt has been made to enforce the patent abroad, but all foreign firms selling cars in France have been obliged to pay royalty.

CARBURETER APPEAL RECALLED

Chicago, March 31—The latest development in the suit of the Stromberg Motor Devices Co., of Chicago, against the John A. Bender Co., of this city, a local dealer, is the recalling of the appeal on the part of the plaintiff's attorney, which asked that the Zenith Carbureter Co., of Detroit, maker of the Zenith carbureter, be made a party of the suit. This action was taken yesterday. The John A. Bender Co., agent for Keeton car, which uses Zenith carbureters, has dismissed the attorneys which, it is said, represented the Zenith company, and by its own attorney, Franklin S. Catlin, has announced its intention of remaining out of the litigation.

The decision, which was handed down several weeks ago by Judge Sanborn, calls for a perpetual injunction, making the John A. Bender Co. an infringer of the Ahara patent, but this did not include the Zenith company. In order to make the Zenith company a party of the suit the lawyer for the Stromberg company, Charles A. Brown, filed a motion asking that this be done. This motion was the one that was cancelled yesterday.

At present the situation calls for payment of royalty by the John A. Bender Co. to the Stromberg company for all carbureters which it sells which are of Zenith make.

"The Zenith company, as shown by affidavits on file, maintained and conducted the defense and this makes the Zenith com-

pany practically a party of the case and the Zenith company therefore will be estopped, having had its day in court, from further contesting the validity of either the Ahara or Richards patents," is the declaration made by Attorney Brown of the Stromberg company.

Victor R. Heftler, president of the Zenith company, called to the long distance telephone, declared that his company is not involved in the Chicago case and that it will await action on the part of the Stromberg company.

KELLY-SPRINGFIELD STATEMENT

New York, March 30—The Kelly-Springfield Tire Co. has issued a statement for the year ended December 31, 1913, as follows: Gross profit, \$1,264,567; operating and administrative expense, \$716,189; net operating income, \$548,378; other income, \$43,376; total income, \$591,754; interest, \$32,210; total net profit, not including profit on goods sold and not delivered, \$559,543.

The consolidated balance sheet of the company, as of December 31, 1913, shows assets as follows: Cash, \$145,733; notes and accounts receivable, \$535,121; prepaid charges, \$33,979; inventories, \$1,231,608; plant accounts and patents, trade marks, good will, etc., \$7,888,618; total, \$9,835,060.

The liabilities are as follows: Accounts payable, \$17,938; reserve accounts, \$352,784; accrued charges, \$14,037; stock of subsidiary companies, \$500; debenture bonds, \$2,850,500; preferred stock, \$1,149,500; common stock, \$4,000,000; profit and loss surplus, \$1,449,799; total, \$9,835,060.

PELLETIER LEAVES MAXWELL

Detroit, Mich., March 30—E. LeRoy Pelletier has severed his connection as advertising counsel of the Maxwell Motor Co., following the taking over of the advertising of the concern by the Van Cleave Co., New York. Mr. Pelletier thus again severs his connection with Walter E. Flanders, now head of the Maxwell company. Formerly he was connected with Mr. Flanders in the Flanders Motor Co., and earlier still with the E-M-F interests, which were taken over by the Studebaker corporation.

Mr. Pelletier still retains his advertising counsellorship of the Lozier Motor Co. and also is interested in the Flanders Electric, Inc., of Pontiac, Mich., besides being connected with a prominent advertising agency of this city.

METROPOLITAN S. A. E. MEETS

New York, March 27—The regular monthly meeting of the metropolitan section of the Society of Automobile Engineers was held last night at the Autom-

bile Club of America. The subject of the evening was the "General Trend of American Motor Design," the paper being read by William M. Power.

There was a brief discussion of a plan suggested by David Beecroft for an associate or student membership in the metropolitan section. Mr. Beecroft pointed out that there are thousands of young men in and around New York who either are taking engineering courses or who have just graduated from engineering schools, who would gladly affiliate themselves with the society and do much to put enthusiasm and new ideas into its meetings if they could do so at a nominal fee. He suggested that such a fee should be \$3 or \$4 a year and should convey the right to attend the meetings. Chairman Anaglada referred the matter to a committee which will report at the next meeting.

The next meeting of the society will be held on April 30 when Finley R. Porter, former engineer of the Mercer Automobile Co., will read a paper on the "Influence of Racing on Motor Car Design." This will be illustrated by moving pictures of the grand prix and other races.

HORN COMPANY IN TROUBLE

New York, March 30—A petition in bankruptcy has been filed against the Square Motor Horn Co., manufacturer of horns at 18 Broadway, with a factory in Newark, N. J., by three creditors, involving \$535. It was alleged that the company is insolvent, made preferential payments of \$1,000, and transferred merchandise and accounts of \$500. The liabilities are over \$10,000 and the assets over \$2,000. The company was incorporated in May, 1913, with a capital stock of \$5,000.

NEW CANADIAN ENTERPRISE

Fort Erie, Ont., March 31—The Johnson Motor Co. is to be incorporated here shortly with capital stock of \$1,000,000. It will be a closed corporation and no stock will be offered for sale. The factory is to be constructed on the west side of the Grand Trunk tracks. The total cost of the plant is \$200,000 and the buildings will be in three wings. The factory will employ about 1,500 skilled workmen. The car to be manufactured in the new plant here will be made to retail at \$250 and will weigh only 375 pounds. It will carry two people. All of the parts of the machines will be manufactured in the local factory with the exception of the tires. The car will be known as the Herman Johnson.

HERRESHOFF REFEREE REPORTS

Detroit, Mich., March 27—At the first meeting of the creditors of the Herreshoff Motor Co. today, Referee in Bankruptcy Lee Joslyn appointed the Detroit Trust Co. trustee. According to its schedule, the defunct concern has total liabilities amounting to \$142,819 and assets sched-

uled of \$321,821. Of the total liabilities, \$85,620 is secured and \$52,862 is not secured. The custodian has appraised the machinery, tools and equipment at \$4,263 and the merchandise on hand at \$31,358.

The appraisal to determine the value of the assets has not yet been made, but the trustee is taking figures to ascertain whether or not the plant should continue to be operated. It has been inoperative for some time. The next meeting of the creditors is scheduled for April 10.

CHALMERS BRANCH IN NEW YORK

Detroit, Mich., March 28—Hugh Chalmers today announced the purchase by the Chalmers Motor Co., of Detroit, of the business of Carl H. Page & Co., for the past 6 years successful metropolitan distributors for Chalmers cars. The transaction includes the purchase of the good will and business of the main establishment of C. H. Page at Broadway and Fiftieth street, the branches in Brooklyn and Bridgeport and the control of territory adjacent to New York. The Chalmers company will assume immediate control of the eastern distribution of Chalmers cars, establishing the New York business as a factory branch. The name of the company in the future will be the Chalmers Motor Co. of New York. George Stowe, who has been general manager of the Carl H. Page interests, will remain with the Chalmers factory branch as active manager.

"We have felt for some time the desirability of establishing a general factory distribution station in the east," said Mr. Chalmers. "New York and the metropolitan district constitute in themselves the largest motor car market in the eastern part of the country. New York also is the

logical distributing center for all of the eastern territory. In planning the eastern distribution of Chalmers cars from New York it has seemed logical to purchase the business of Carl H. Page & Co. and conduct it as a factory branch, both in the sales and in the service divisions."

NEW YORK CONCERN BANKRUPT

Buffalo, N. Y., March 31—The Housel Mfg. Co., of East Rochester, N. Y., maker of parts, filed Monday afternoon here in United States district court a petition in bankruptcy listing its liabilities at \$26,163.26, while assets were scheduled at \$10,630.69. Of the liabilities \$19,445.94 are in unsecured claims. Of the assets \$2,276 is for outstanding accounts, \$3,531.50 is the value of stock on hand and \$2,400 is the price of machinery in the company's plant. Last Thursday the directors on examining the financial affairs of the concern voted that its liabilities be liquidated through bankruptcy proceedings.

KIRKHAM ASSETS SOLD

Bath, N. Y., March 31—At a trustees' sale of the assets of the bankrupt Kirkham Motor Co. held in Bath, Friday, the building was sold to Dr. Douglas H. Smith of Bath for \$5,010. It is said Dr. Smith intends using the building for hospital purposes. The machinery and tools were sold to A. R. Morris of Newark, N. J., for \$8,050. Other materials brought various sums. Of the total amount realized, \$12,910 will be devoted to meet an outstanding bond issue. That will leave approximately \$1,705 for partition among the general creditors, whose claims aggregate upwards of \$60,000.

Winternitz Buys the American Plant

Chicago Auctioneer Bids \$110,000 for Assets

INDIANAPOLIS, Ind., March 30—Samuel L. Winternitz & Co. of Chicago, auctioneers, were the highest bidders today at the sale of the plant of the American Motors Co. Their bid was \$110,000 but the sale is subject to the approval of Judge Albert B. Anderson of the United States court in which the American receivership and bankruptcy proceedings are pending.

Samuel Winternitz announced that it is the intention of his company to resell the property at public sale piecemeal, which means that the American underslung motor car will pass out of existence. The sale was conducted by A. Greenwald, auctioneer, for Frank E. Smith, receiver. The plant had been appraised at \$94,000 and the terms of the sale were \$20,000 deposited at the time of the sale and the remainder to be paid in 10 days.

There were about twenty bidders and the bidding was spirited until toward the last, when it narrowed down to the suc-

cessful bidder and Mr. Finnegan of Buffalo, N. Y., who bought the property of the E. R. Thomas company some time ago.

The first bid was \$50,000, made by Finnegan. J. I. Handley, president of the American Motor Co., bid until the \$80,000 point was reached. Other bidders were Jack Strauss, New York; John Nuttall, Philadelphia, Pa.; Mr. Levine, Philadelphia, Pa.; G. V. Nelson, of the Auto Parts Co., Chicago; George Sachseumaree, Philadelphia, Pa., and several others.

Samuel L. Winternitz & Co. have bought several motor car plants during the last few months, among the number being that of the Michigan Buggy Co., Kalamazoo, Mich., the Falcar plant, the Midland plant, the Grabowsky truck plant and others.

There was no real estate involved in the American sale. It was thought that some of the old stockholders would attempt to buy in the property and reorganize the company.

Elgin Changes Road Race Dates and Classifications

Mercers Enter at Indianapolis—Oldfield in Stutz

By C. G. Sinsabaugh

CHICAGO, March 30—The fifth annual Elgin road races will be run August 21-22 instead of August 28-29, assigned by the American Automobile Association. This change is made in order to avoid a clash with the speedway meet at Pomona, Cal., September 9, when a \$25,000 purse will be hung up.

Again the Chicago Automobile Club will promote the meet, the contract with the Elgin Automobile Road Race Association having been signed today. Chairman Joseph E. Callender of the C. A. C. contest committee now is engaged in framing up the program and the entry blanks will be out inside the next 2 weeks.

Change in Elgin Classifications

The card this year will be different from last year's, it having been determined to make the first day's race for the Chicago Automobile Club trophy for cars 450 inches and under, while the Elgin National trophy race will be a free-for-all. Last year the first day was 300 inches and under and the second day the limit was 450. It has been found, however, that there is a dearth of small cars and that by fixing the card as it now is that most of the drivers can participate in both races.

Work on the course has started already. The farmers, who have been paid \$70,000 in the 4 years the races have been held, have been appealed to to help in fixing up the course and they have agreed to do their share, which will take a big load off the treasury of the Elgin association.

The Mercer company has filed its entry for the 500-mile race at Indianapolis. Three cars have been put in, whereas it was figured that possibly there would be only two because of de Palma not rejoining the team. The company, however, will depend upon Spencer Wishart and Ed Pullen and possibly will put Caleb Bragg behind the wheel of the third car, provided the grand prix winner of 1912 can be coaxed back from Europe. The cars are the same three that ran at Indianapolis last year, but a year's tuning up make them look far more formidable now than they did last summer, when they were dropped into the sweepstakes still green. Two of them are of 445-inch displacement and the other is a 300-class car. Wishart is to drive one of the big cars and Pullen the little one.

The entry of the three Mercers and a third Stutz bring the total to date up to nineteen, the entry of de Palma in a Mercedes having been officially acknowledged by the speedway management.

The field, at present, stands as follows: Burman, driving his own car; Anderson, Stutz; Cooper, Stutz; Keene, Bullet; Goux, Peugeot; Boillot, Peugeot; Chassagne, Sunbeam; Guyot, Delage; Christiaens,

Excelsior; Duray, Peugeot; Klein, King; Thomas, Delage; Burman, no name; de Palma, Mercedes; Pullen, Wishart, and one other, Mercer; Oldfield, Stutz.

Barney Oldfield will drive a Stutz in the 500-mile race, which means that the Stutz company has entered a third car. Oldfield himself makes the announcement from Los Angeles. This will give Harry Stutz a strong team, for with Oldfield, Cooper and Anderson as his pilots he will have three of the best drivers in the country.

Stutz became enthused over Oldfield at Santa Monica. He saw the enthusiasm of the veteran, admired his cool and daring driving and became convinced that the Oldfield of the present day is a far different chap than the Oldfield who used to barnstorm it through the country.

"Oldfield used to drive for money only and keeping one eye on the box office blinded him," says one critic. "Now Oldfield has the money and he is driving for reputation just as would a wealthy young chap like Bragg or Wishart. And he has been a different man since he took this position. Since he ran fourth in the grand prix at Milwaukee he has realized what it is to drive more for sport than for the coin. His work at Santa Monica last year and this, at Corona and in the desert road race, shows that he has it in him."

Ralph Mulford's Peugeot entry at Indianapolis has been declined because of the rule forbidding more than three cars of one make starting in a race run under A. A. A. sanction. Goux, Boillot and Duray beat him to it and now he probably will drive the Schroeder Mercedes instead.

Peugeot Motor in Mercedes

After having the Peugeot entry rejected Schroeder promptly nominated the Mercedes which de Palma drove at Santa Monica, stating that he probably will fit it with the motor from the Peugeot. This combination, he figures, will prove even better than the original entry. He likes the Mercedes but he finds it a trifle slow since the motor has been cut to 445 inches. The Peugeot engine is within the 450-limit and Schroeder thinks installing it in the Mercedes chassis will give him a fast car. In the meantime he is trying to get the A. A. A. to revise its contest rules so as to make the entry of a fourth car of any make possible. His argument is that the old necessity for restriction is past, now that the racing game has drifted largely from manufacturers to private entrants. He points out that the promoters of the French grand prix permit the entry of five cars of one make. But even if the A. A. A. changes its rules, it is thought

Schroeder will have to get the consent of the other entrants who made their declarations under the prevailing rule.

That it is up to the American Automobile Association's contest board to do something toward reviving the stock car rules that were the backbone of the sport 2 and 3 years ago, is made apparent by demands that have been made for such a classification recently by promoting organizations. The Chicago Automobile Club is demanding a stock car class for its Chicago to Boston day and night non-motor stop run, which it hopes to pull off this summer, while the Automobile Club of Fayette County, a Pennsylvania organization, goes so far as to list three stock car classes for its annual hill-climb on the National pike near Uniontown, Pa.

Chicago Wants Glidden Trophy

The action of the Chicago Automobile Club, taken last week, is the first gun of what promises to be a vigorous fight for the stock car rule. Always an advocate of it, the club now is determined to see what can be done toward restoring it. The visit to Chicago last week of John A. Wilson, president of the American Automobile Association, gave the club its opening wedge and the arguments that were put up by President Vissering of the C. A. C. convinced Mr. Wilson that something should be done in the matter.

Then the club fired another gun. It decided that if the Chicago-Boston run could be held that the main prize should be the Glidden trophy. This sounded good to Mr. Wilson and immediately the club, through Frank X. Mudd, chairman of the A. A. A. touring board, made formal application to the A. A. A. executive committee for the trophy.

President Wilson listened approvingly to the remarks on the stock car class and promised to do all he could to bring it about. He also agreed to assist in getting the Glidden. He went even further in his effort to be of assistance to the Chicago Automobile Club by tendering to President Vissering the Wilson cup for the touring car that can show an average speed of a mile a minute over a measured mile course. This is the same cup he hung up at Indianapolis 4 years ago and which never was won.

The club's contest committee yesterday took hold of these matters. It was decided to tentatively schedule the Chicago-Boston run for July, but no attempt was made to get down to details until it is known whether or not a stock car rule can be had. The Wilson cup trials will be run off in September. The conditions call for each touring car carrying four persons of an average weight of 160 pounds and to be fully equipped. There

must be two trials, one each way of the course, and the average time will be taken. It is likely that these tests will be made over one of the legs of the old Crown Point road race course.

The Pennsylvania hill-climb is scheduled for June 17-18, and is to be the longest that has been held for several years. The course starts about 3 miles east of Uniontown, with the finish at the summit of Chestnut Ridge, a distance of 3 miles, all of which is up grade and with numerous curves. The surface is of asphaltic concrete, the road being slightly banked at the curves. The average grade is 7.7 per cent, with the maximum at 9.5. In the first mile the average grade is 6.02, in the second 8.8, and in the third 8.2.

On the first day there will be three stock car events for members of the club, followed by two other contests. Price classification will prevail. The second day will be non-stock with piston displacement classification. On the second day cash prizes will be given, \$2,250 being the purse for all the events that day.

STUTZ ENTERS OLDFIELD

Indianapolis, Ind., March 30—The Stutz Motor Car Co. has entered a third Stutz car in the 500-mile race to be run at the Indianapolis motor speedway, May 30, and

has nominated Barney Oldfield to drive the car. Oldfield will drive one of the Stutz cars that started in the Vanderbilt and grand prix at Santa Monica this spring. He expects to arrive in Indianapolis about May 1 to begin his practice work.

FRANCE CLEARS UP MYSTERY

Paris, March 18—The entry of René Thomas, ex-aviator and member of Peugeot and Delage racing teams, in the Indianapolis race with a second Delage 120 horsepower grand prix racer, puts an end to the mystery which surrounded the Delage car supposed to be ready for the Vanderbilt and the American grand prix races. It now is definitely proved that no serious negotiations for the purchase of this car were ever entered into, and that Omer Toft, reported to have been injured while driving the car in France, had not even seen the car. Several cables had been sent from Los Angeles, and the Delage factory, considering the proposition a serious one, had kept the machine out of the Indianapolis race. As soon as he was convinced that there was nothing to the American offer, Louis Delage signed the entry blank for the Indianapolis race and gave instructions to Thomas to be ready to sail with Albert Guyot on May 9. The cars are

for sale, but they cannot pass out of Delage's hands until after the Indianapolis race.

The second Delage is a sister machine to the one to be driven by Albert Guyot. These cars finished first and second in the grand prix de France, establishing a world's long distance road record of 76.8 miles an hour and a world's lap record of 82.5 miles an hour. In the Automobile Club grand prix last year they finished fourth and fifth and doubtless would have won only for accidents. Guyot was leading the field when his mechanic fell out of the car and was run over and Bablot was second when, in his desire to economize fuel, he stalled his motor and was unable to crank it.

The Delage racing motors have four monoblock cylinders of 108 by 180 millimeters bore and stroke. They have four horizontal valves per cylinder, a ball-bearing crankshaft, two magnetos firing simultaneously, and pump circulation. Lubrication is under pressure to all parts. The cars have five-speed gearboxes and are shaft-driven.

It is interesting to note that the Delage cars have only been in two big races, but all the cars have gone through them without lifting the bonnet and without a tool being used.

Tour of France Proving Strenuous Test of Cars

Two Buicks Among the Perfect-Score Survivors

By W. F. Bradley

PARIS, March 21—Out of thirty-three starters, nineteen cars have been eliminated in the 3,000-mile tour of France reliability competition. Three stages, including a 60-mile race, have to be covered before the tour comes to an end at Paris, and it is quite likely that the fourteen machines will be still further reduced in numbers. The percentage of failures is higher than in any French competition of previous years and may be contributed to the severity of the test itself, the unusually bad weather conditions, and the unnecessarily fast and reckless driving of many of the competitors.

Rules Are Rigid

The rules impose an average speed of 19 miles an hour on daily stages varying from 190 to 280 miles, all work on the cars to be done during running time. A day is spent in each headquarters town in order to hold short-distance speed or hill-climbing tests, participation in these being obligatory. Standard touring cars of 183 cubic inches cylinder capacity are eligible to take part in the tour. With very few exceptions the touring equipment is of the most rudimentary nature and complies more with the letter than with the spirit of the law.

Failures have been much more numerous in the small-car than in the big-car section. In the 183-cubic inch class there were two

withdrawals at outset of the tour by reason of mechanical failure. After covering ten stages a Barré car was disqualified for late arrival due to colliding with a cart at a cross roads. This car was driven by René Thomas, who is scheduled to handle one of the Delage racers at Indianapolis next May. Thomas was in charge of the Barré team and had brought all three cars through with clean scores up to this point. Albert Guyot, another Indianapolis race driver, is in charge of a Martini.

In the 168-cubic inch class there have been two failures, a Hispano-Suiza which had valve trouble, and an Italian Diatto which overturned.

There are two Buicks in this section, both of them with clean scores. On the Alpine stage, from Lyons to Nice, D'Avaray's Buick collided with and killed a cow, with the result that the frame members were bent, the front axle put 4 inches out of true, and the starting handle torn away. This did not prevent D'Avaray continuing and even taking part in the speed trials with very satisfactory results. The second Buick, driven by Matthys, is in excellent condition.

Four cars have dropped out of the 146-cubic inch class; one of these withdrawals was due to a skid and the breaking of

a stub axle, but the others were kept secret. Six cars dropped out of the 122-cubic inch class, leaving only two machines in the running. Among the failures were three Bellangers fitted with Knight motors of 74 by 114 millimeters, probably the smallest Knight motors made in Europe. An Aquila-Italiana of 70 by 120 millimeters was disqualified but continued unofficially, and a Scap did the same. The only clean-score machines in this section are an inside steering Zedel driven by a woman, and a two-seater Phoenix.

Bugatti Without Competitor

All the competitors but a Bugatti dropped out of the 91-cubic inch class. A Mathis, the smallest car in the tour, having a four-cylinder motor of only 56 by 100 millimeters bore and stroke, covered half the distance before it was stopped by a burned-out connecting rod end, provoked by an obstruction in one of the oil leads. The motor was repaired and continued unofficially.

This year's trial has been a supreme test of high-speed high-efficiency motors of small cylinder area. The three Barrés, for instance, are fitted with a new type of Ballot motor 3.1 by 5.9 inches bore and stroke, intended to be offered to the trade next season. The motor is of the L type, with integral intake and exhaust manifolds, pump circulation and forced feed

lubrication, and is declared to develop from 58 to 60 horsepower. These cars are very carefully handled on the road and are run at 36 to 42 miles an hour. This leaves an ample margin for tire changes, incidental stops and supervision of all the organs before entering the control. As an indication of the speed abilities of these cars, a Pierron with a Ballot motor identical with those on the Barré cars, showed 58.86 miles an hour for the measured kilometer flying start, and Thomas in a Barré, averaged 45.65 miles an hour for the kilometer standing start on a moderate road with three bends. These speed trials were made when the cars had covered about 2,000 miles competition touring.

Guyot's Martini in the 183-cubic inch section is a sporting type Martini, having sixteen overhead valves and twin ignition. On some of the stages it has averaged 36 miles an hour for 150 miles of ordinary unguarded road. The Hispano-Suizas in the tour are the firm's new models with inclosed overhead valves, the camshaft and all valve-operating mechanism working in an oil bath, and each cam having a separate oil trough. Gregoire has a special high-efficiency motor in the 146 cubic inch class. The motor, which has been designed by Picker, is of T type, measuring 2.7 by 5.5 inches bore and stroke. Mounted in a light chassis, this car is one of the fastest in the tour. For the flying kilometer it showed 45.6 miles an hour, and for the standing kilometer 41 miles an hour. In these tests the cars are not pushed to their limits, for the drivers are more concerned to finish the trip than to establish a local record.

In Interesting Country

This year's tour of France has opened up a lot of interesting touring country. Starting from Paris, the run was to Boulogne, then along the eastern frontier over well known ground. From Lyons the competitors were taken along the flank of the Alps to Nice, a distance of 280 miles in 1 day. This constituted the most difficult stage of the tour.

Mountain work had to be undertaken immediately after leaving Grenoble and two passes climbed at an altitude of 5,000 feet. The run from Nice to Avignon, the road being cut on a ledge above the Mediterranean for more than 30 miles, provided some of the finest scenery in Europe. Entirely new country was uncovered in the run from Avignon to Clermont-Ferrand, the road lying right through the wild Cevennes mountains, and through the picturesque Auvergne mountains.

It was the first time a motor competition of any kind had gone through this district, and although the road surfaces are good very few tourists know of this district. Numerous difficult winding climbs had to be undertaken, but the highest altitude was not much above 4,000 feet. Clermont-Ferrand to Toulouse, again through the central mountains, proved a difficult task while providing beautiful scenery.

Michigan Law Held Unconstitutional

Horsepower Tax Knocked Out by Wolverines

LANSING, Mich., March 26—The new Michigan motor tax law, passed by the last legislature, and which provided for a tax of 50 cents per horsepower, was declared unconstitutional by the state supreme court March 26, to which court it was carried by the supervisors of Wayne county.

The decision of the supreme court in part says: "The clear purpose of the legislation in exacting so large an amount from the owners of motor cars was to produce a fund for highway purposes under the guise of regulation which makes it a tax measure, which clearly is not covered by the title of the act. The obvious purpose of the amendment in the act of 1913, increasing the fee according to horsepower, was to increase the fund. There can be no more labor or expense in registering a vehicle of high horsepower than in registering one of low power and the only reasonable purpose in the graduated fee is the increased revenue. This graduated fee according to horsepower must be held to be a mere guise or subterfuge to obtain the increased revenue."

Justice Stone wrote the opinion.

The decision of the Michigan supreme court means that the large proportion of the tax of \$200,000 must be returned to owners from whom it was collected. The only part of the tax that can be retained by the state is the old tax of \$3 per car.

After the bill had become a law its constitutionality was attacked by the board of supervisors of Wayne county, setting forth that millions of dollars worth of property would be taken off the Wayne county tax rolls and that the money would be used in the construction of roads in other parts of the state. The board also contended that it was a discriminating measure. The money collected from the tax was turned over mostly to the state in the construction of good roads.

Under the graduated law of 50 cents per horsepower, the old car paid as much as the new, and the high-price electric vehicle got off with very little taxation. The overthrow of the new law, however, does not benefit the motorists' pocket-books at all. They now must pay personal taxes which in most cases will more than equal the difference between the \$3 flat rate and the 50 cents-per-horsepower rate, which exempted the machines from further taxation.

Wisconsin Will Fight

Milwaukee, Wis., March 30—A concerted movement to test the validity of the Wisconsin law requiring the registration of motor cars and the payment of a \$5 fee by private owners at the beginning of each year, is proposed by several motor clubs of Wisconsin. The recent successful

action against annual registration fees in Ohio has stimulated effort here.

Milwaukee motorists claim they are subjected to double taxation, as the state collects a license fee and also a personal property tax on motor cars. As the personal property tax is higher than the annual license fee in a great majority of cases, it is proposed in some quarters to compromise the situation by making the license fee receipt an offset on the personal property tax payment. In the payment of income tax in Wisconsin the personal property tax receipt is an offset.

The motor registry fees in Wisconsin are annual in nature and are as follows: Private owners, \$5; dealers, \$10; motorcycles, \$2; transfer of license from one car to another during any one year, 50 cents. The net profits now go into the state highway fund.

Ohio Wants Uniform Law

Youngstown, O., March 30—At the annual meeting of the Ohio Automobile Association held in Youngstown, Saturday, a committee was named to draft a bill to be presented to the next session of the Ohio general assembly in an effort to systematize the motor law of the Buckeye State. A number of changes from the present law will be included in the bill such as a more rigid examination for chauffeurs, substitution of green for red rear lights, displaying lights on all motor-driven or horse-drawn vehicles at night and the lessening of the fees for registering motor cars.

Officers were elected as follows: C. C. Janes, Columbus, re-elected president; Royal R. Scott, Toledo, first vice-president; W. V. Faunce, Youngstown, second vice-president; Fred Cuthbert, Lima, third vice-president; Fred H. Caley, Cleveland, secretary; James J. Allen, Kenton, treasurer. The board of trustees consists of L. M. Browne of Columbus; A. V. Coate of Cleveland; Charles Marcy, Conneaut; C. G. Thompson of Toledo; P. F. Minnock of Columbus; G. E. Mentel of Springfield; L. Henderson of Youngstown and W. A. Hoberdier of Canton.

Calls Law a Police Measure

Des Moines, Ia., March 30—W. S. Allen, secretary of state, has made a ruling that the Iowa registration fee for motor cars is a police measure and not taxation. This was made in the case of a Vinton man who bought a second-hand car in 1914 and for which the previous owner had not paid the 1913 fee. Secretary Allen holds that the new owner must pay the 1913 fee and that it is the duty of a person buying a second-hand car to see that the fee for the previous year has been paid. The question probably will go to the courts for settlement.

Status of Klaxon-Sparton Litigation

Question in Abeyance Until June 30

NEW YORK, March 28—In the issue of Motor Age, March 19, page 22, in the report of the Klaxon vs. Sparton litigation before Judge Hough in the United States district court, the statement was made that a permanent injunction had been issued against the Garland Auto Co., the Haynes Auto Co., and the Jackson Eastern Distributor, Inc., dealers in the Sparton horns, but, that by the payment of \$2,000 to the Klaxon interests the court granted the privileges of the secession of this injunction until June 30.

It was in error to state that these companies dealing in the Sparton horn had to make payment of this sum. The decision of Judge Hough stating that the defendants, or Sparton interests, were required before March 25, 1914, to give the Klaxon a bond or undertaking to the sum of \$2,000, conditioned for the payment of all damages or profits which may be shown to be due complainant by reason of manufacture or sale of Sparton horns until June 30, 1914.

By Judge Hough's decree the question between Klaxon and Sparton is left in abeyance until June 30, at which time it is expected that a decision from the court of appeals will be handed down in the Klaxon vs. Newton suit, which decision would have a bearing on any decision that Judge Hough would render. The \$2,000 bond merely is to cover for damages that might arise during this interim or period of waiting, should the court of appeals decide in favor of Klaxon.

Judge Hough's decree states "that complainant (Klaxon), having waived its rights thereto, defendant (Sparton) shall not make an accounting of any gains and profits by it made, nor shall the complainant recover out of said defendant the damages sustained by the complainant down to March 25, 1914, nor any costs or charges in this suit."

Court Decision in Full

In its decree the court reserves its right of changing, modifying, reviewing or reversing the decree during the time as extended to June 30. The complete decree follows:

This cause, having come on to be heard; thereupon, upon consideration thereof, it is ordered, adjudged and decreed, as follows:

1—That Lovell-McConnell Mfg. Co., a corporation of Delaware, the present complainant, is the owner of the entire right, title and interest in the letters patent in suit numbered respectively 923,048, 923,049 and 923,122, all issue on May 25, 1909, upon the applications of Miller Reese Hutchins, and of all rights pertaining to each of said letters patent.

2—That said letters patent No. 923,048, for mechanically-actuated acoustic apparatus and method, is good and valid in law as to the claims in issue, namely, 16, 17, 19, 24, 27, 29, 36 and 37, and that the defendant Garland Automobile Co. has infringed said claims;

That said letters patent No. 923,049, for cam-operated horn, is good and valid in law as to the claims in issue, namely 1, 2, 12, 13, 22 and 30, and that the defendant Garland Automobile Co. has infringed said claims;

That said letters patent No. 923,122, for mechanically-actuated diaphragm horn or

alarm, is good and valid in law as to the claims in issue, namely, 1, 2, 3, 45, 47 and 53, and that the defendant Garland Automobile Co. has infringed said claims.

3—That by the infringements aforesaid the said defendant has violated the exclusive rights of the complainant in the several enumerated claims of said letters patents.

4—That a writ of injunction, directed to said Garland Automobile Co. be on March 25, 1914—unless stayed as hereinafter directed—issued out of and under the seal of this court permanently enjoining and restraining defendant, and defendant's officers, attorneys, clerks, servants, agents and employees, from directly or indirectly making or causing to be sold, any devices or horns containing, embodying or employing the said inventions embraced in or covered by the said claims 16, 17, 19, 24, 27, 29, 36 and 37, of said letters patent No. 923,048, claims 1, 2, 12, 13, 22 and 30 of said letters patent No. 923,049, and claims 1, 2, 3, 45, 47 and 53 of said letters patent No. 923,122, or any of said enumerated claims of said letters patent, or the rights of complainant thereunder.

5—That complainant having waived its right thereto, defendant shall not make an accounting of any gains and profits by it made, nor shall the complainant recover out of the said defendant the damages sustained by the complainant down to March 25, 1914, nor any costs or charges in this suit.

6—That if before March 25, 1914, the defendant herein give to complainant a bond or undertaking, in the sum of \$2,000 conditioned for the payment of all damages or profits which may hereafter be shown to be due complainant by reason of defendant's use, manufacture or sale of any article or device covered by the hereinabove enumerated claims of the patents in suit, from and after March 25, 1914, then and in such case no injunction shall issue until the further order of this court, or June 30, 1914, as the case may be.

7—That the term of this court at which this decree is entered be and the same hereby is extended for all purposes relating to this cause until June 3, 1914, and specially is the power reserved of changing, modifying, reviewing or reversing this decree, during the term as extended, in any way, method or manner for which application may be made and approved.

FAVORS HIGHER FREIGHT RATE

Indianapolis, Ind., March 30—The Prest-O-Lite Co., of Indianapolis, has notified the interstate commerce commission that it favors the proposed 5 per cent increase in freight rates for the railways. The company is one of the largest manufacturers in Indianapolis and has fifty-two branch stores and plants throughout the United States and is spending approximately \$250,000 yearly for freight charges. In explanation for its stand, the company says it believes the time has come for manufacturers and shippers to realize the importance of railways and to quit attacking the railways' source of income and dictating increased forms of railway expense. Some time ago the Indianapolis chamber of commerce adopted a resolution opposing the increase.

KLINE BUYS MOTOR PLANT

Richmond, Va., March 28—Announcement was made today that through a deal closed by the Kline Motor Car Corp. that firm will manufacture the whole of its product at the local plant in Richmond. W. S. Roberts, secretary of the corporation, received a telegram from James A. Kline, general manager, who announced that he had bought the plant of the Kirkham Motor Mfg. Co., Bath, N. Y., at a receiver's sale. Included in the purchase

was a large amount of rough and finished material. All will be shipped to Richmond at once in order that there will be no delay in building the motors for the cars now under construction.

The new arrangement means that the Kline company will more than double the number of its employees. The Kline company has a modern plant here, with a present output of approximately 1,000 cars a year. The buildings are 600 feet in length and are constructed so there are two wings 60 feet wide with railroad tracks in the center for the loading and unloading of the material and the finished product.

PERU ENGINE PLANT SOLD

Peru, Ind., March 28—The Pittsburgh Model Engine Co., with a capital stock of \$750,000, has purchased the property of the Model Gas Engine Works. It will open a new factory in Pittsburgh and operate the Peru plant as a branch. Until the Pittsburgh plant is completed in July the headquarters of the company will be in Peru.

The management will remain practically the same as that which controlled the old company. The officers are: President, W. J. Strassburger; vice-president, E. A. Myers; treasurer, J. F. Keenan; secretary, J. W. Littlejohn.

LEWIS SIX MAKES ITS DEBUT

Racine, Wis., March 28—The second annual motor and accessory show given by the associated dealers of Racine, Wis., in the Lakeside Auditorium from March 26 to 28, inclusive, served the L. P. C. Motor Co., of Racine, with an opportunity to make its formal bow to the public with its new Lewis six. The show being principally of local interest and attraction, the debut of Captain William Mitchell Lewis' new product was the most prominent feature of the exposition. Twenty-two distinct makes of cars were shown.

PAYING BOARD TRUCK CLAIMS

Richmond, Va., March 28—William H. Gaines, clerk of the United States district court in Alexandria, has announced that within a few days he will distribute \$9,463.79 among the fifty-eight creditors of the B. F. Board Motor Truck Co., Inc., which was adjudged bankrupt July 9, last. This sum will represent a dividend of 40 per cent of the claims against the company, and it is said that a further dividend of 25 or 30 per cent will be paid within a few months.

WESTINGHOUSE DIVIDEND DECLARED

New York, March 30—The Westinghouse Electric and Mfg. Co. has declared the regular quarterly dividends of 1½ per cent on the preferred stock, and 1 per cent on the common stock. The preferred is payable April 15, to stock of March 31; the common is payable April 30 to stock of record March 31.



The Readers' Clearing House



PRESENT RATINGS ARE CONFUSING Horsepower Ratings of Motors Not Standardized—Block Test

CHILCOCK, Okla.—Editor Motor Age—Why is it that motor car makers give one horsepower and Motor Age another? For instance, the Hupmobile company claims 32 horsepower and your S. A. E. rating is 16.90; the Buick people claim 28 and 32 and you say 22.50. These figures are taken from the table in Motor Age issue of January 1, and are confusing. Is it not possible to have one test for determining all motors as to horsepower, standardizing same so that the layman might absolutely know what horsepower he is actually buying and be able to compare and judge positively the different motors as to this one feature?

2—Is the horsepower as given by manufacturers, found by testing each motor in the chassis, or in the shop, before mounting in chassis?

3—Is there any motor car which has the actual horsepower claimed for it by its makers?

4—I notice that in your ratings, in the table referred to, you designate several models of the same make as having the same horsepower, when the makers give each model a different rating. To take your figures one would have to believe the motor was exactly the same in each model, though the makers say that each model has more horsepower according to price. Why is this?—E. K. Miller.

1—Motor Age in all its ratings quotes the S. A. E. horsepower of the engine which is obtained by solution of the equation,

$$\text{horsepower} = D^2 N \div 2.5$$

where D is the bore in inches and N the number of cylinders.

This equation when solved gives the horsepower at 1,000 feet per minute piston speed.

The S. A. E. horsepower rating is not the actual horsepower of the motor and the only way to get the real power is to place the motor on test. At present the S. A. E. formula is the only standard formula in use, and is a convenient taxation formula.

Some manufacturers rate their motors according to the result obtained by the formula mentioned, while others use the result obtained by actual test. The Packard 2-38, for example, has an S. A. E. rating of 38.4 horsepower, but the motor shows much more on the block. The Hupmobile 32 develops 32 horsepower on the block, it is claimed, but when rated by Motor Age is given the S. A. E. rating of 16.9. The only way a buyer has of know-

ing the actual horsepower of the motor he is buying, is to get a horsepower curve of that motor as obtained from an actual test.

2—The motor is usually tested for horsepower when it is out of the chassis.

3—Most of the manufacturers are truthful as to the results obtained from a test, and any of them will gladly give you the figures.

4—The S. A. E. formula does not take into consideration directly, the stroke or the crankshaft speed in r. p. m., but considers only the bore and number of cylinders. Therefore two motors of the same bore and the same numbers of cylinders, but with different strokes, would have the same rating, even though one is more powerful than the other.

There are a number of formulas which take the stroke and the r. p. m. of the motor into consideration in determining the horsepower. One of these which gives results very close to the actual power of the motor is that proposed by Motor Age. This simply is the S. A. E. formula with the length of stroke and crankshaft speed separated and made factors instead of having them combined in the constant of 1,000 feet per minute piston speed. In fact, this has come to be known as the modified S. A. E. formula. The formula is,

$$D^2 N S R$$

$$\text{horsepower} = \frac{\quad}{15,000} \text{ where}$$

D equals the bore in inches,
S equals the stroke in inches,
R equals the r. p. m. and
N equals the number of cylinders.

WHICH GRADE OF FUEL IS BEST The Lighter the Gasoline the Better It Is Suited for Motors

PARSONS, Kans.—Editor Motor Age—What is considered the best gasoline for motor cars, a high or low test? What is the best high or low gravity?—L. R. Davis.

A gravity test of gasoline is not an absolute one, that is, two grades of gasoline

of the same gravity test might show a difference in a motor. The ranges of boiling points and the amount of impurity in the fuel is a more positive test. In general, however, it is considered that high gravity gasoline, by which is meant, gasoline giving a high reading on the Baume scale, is a better motor fuel than one giving a lower reading, because it will vaporize more quickly as it is lighter. On the other hand, if the specific gravity scale is referred to, the lighter the gasoline, the lower the specific gravity is, so that with specific gravity as a basis, the low gravity gasoline is better than the high gravity. However, it is the usual thing in America to consider only the Baume scale. The high gravity gasoline is generally the lighter and is considered the better.

SEATING ARRANGEMENTS OF CARS

With Passengers in the Middle of Chassis, the Car Rides Easy

CHARLOTTESVILLE, Va.—Editor Motor Age—I am about to purchase a six-cylinder two-passenger roadster and the following information will help me in my selection. One car has the seats set far forward on the frame, in some instances the location being nearly the same as front seats of a regular touring car. The other has the seats set well back on the frame, in one case the back of the seat is just in front of the rear mud guards. Kindly give the advantages and disadvantages of both types.—E. D. Richmond.

The two types of roadsters you mention are illustrated in Fig. 1. With the seats placed in the middle of the frame, easier riding is obtained, provided the spring suspension in both cases is the same. The detail drawing at the top in the left illustration may bring this out more clearly. If a spring is suspended upon two posts and a person sits at a point marked by the arrow, any shocks transmitted to the posts will not be felt very much by the person. However, if the person were to sit, as shown at the right, over one of the posts, all shocks transmitted to the post would be felt to some extent by the person. At the point B the shocks would be less severe, and at the point C still more diminished. So, under ordinary conditions, the car with the seats midway between the

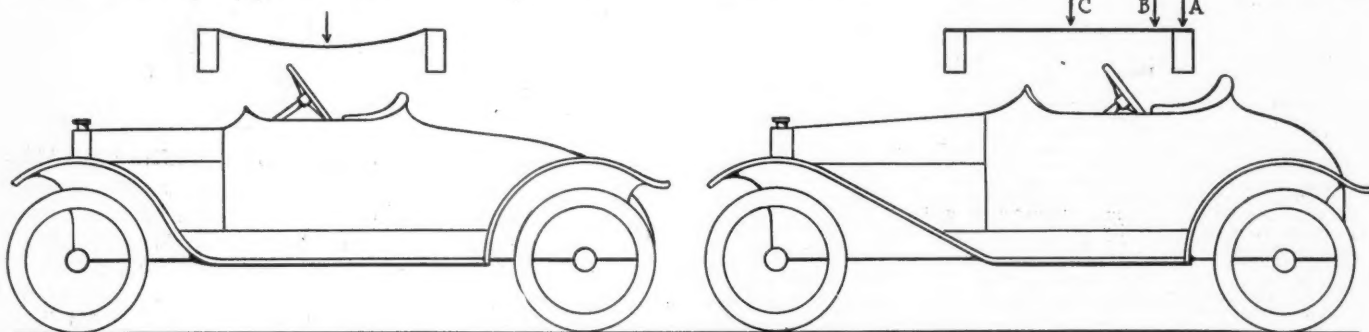


FIG. 1—TWO SEATING ARRANGEMENTS ON A ROADSTER

At the left is shown the type with the seats in the middle of the frame and that at the right with the seats well back and just ahead of the rear axle. Their relative merits are compared in the text on this page

two sets of wheels offers easier riding qualities.

With the seats well back and almost over the rear axle more graceful hood lines may be obtained and the general lines of the body may be brought out better. The steering post may be lowered more and the car given a more rakish appearance. When the seats are in the middle of the frame the hood lines cannot be brought out so well and the steering post is slightly higher. However, this type offers a larger luggage space behind, and the rear deck may be given a better appearance in the eyes of some.

Under certain conditions the seating arrangements in both cases may show the same results, that is, the riding qualities of the one car may be as good as the other. This remains to be tried.

THE TWO-POINT IGNITION SYSTEM

Method of Converting Ordinary Arrangement—Special Spark Plugs

Harbor Springs, Mich.—Editor Motor Age—I have a four-cylinder motor which has priming cups over the exhaust valves and spark plugs over the intake. Will I gain anything by putting an extra set of spark plugs in place of the priming cups, having put on a patent priming cup, letting the gas into the intake pipe? Will it be too much of a pull on the magneto?

My plan is to connect the extra plugs with a short wire from the plugs now in use, thinking that perhaps I would be more sure of a good spark at all times, and perhaps a stronger explosion.—H. P. Blaisdell.

1—Two ordinary spark plugs in one cylinder, the plugs connected in parallel would result in but one spark occurring, and that in the plug offering the least resistance to the flow of current. The only way to convert a single system to a two-spark system is to insulate one of the plugs from the cylinder and attach the wire B in Fig. 2 to the body of the same plug. This would cause the current to pass through the plug, and instead of being grounded, would continue its path to the other plug and then to ground. Another method of obtaining two-spark ignition is by the use of special spark plugs which are made in this country by the Jeffer-Dewitt Co., Detroit, Mich., and the Superior Motor Specialties Co., Philadelphia, Pa. These plugs have two electrodes ex-

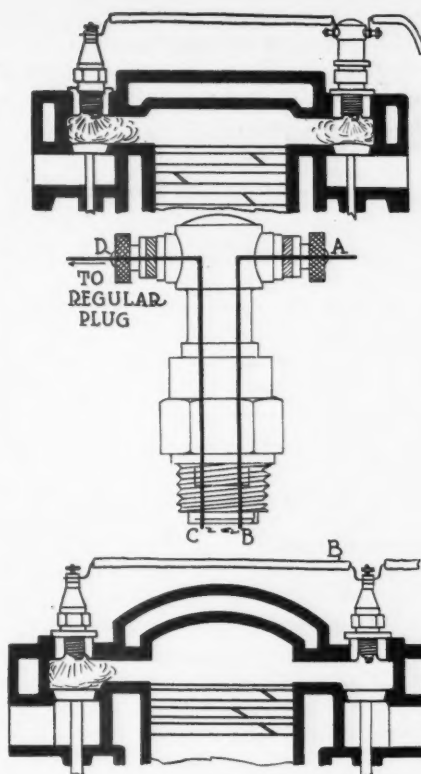


FIG. 2—SINGLE TO TWO-POINT IGNITION

The lower illustration shows the reader's suggested method of placing two ordinary plugs in the cylinder. This would fail, because only one plug would spark. The center illustration shows a type of spark plug making it possible to change to two-point ignition, and the upper illustration shows how the special plug is connected.

tending through the body as shown in Fig. 2. Connected as shown, in series with a regular plug, the current will pass from the magneto to the electrode A, then down the electrode to B, across the gap to C, up the electrode to D and then to the regular spark plug where it jumps the gap and is grounded.

There will not be too much of a pull on the magneto, and the two sparks occurring in the cylinder at the same time, will probably give more power.

DATA ON PERMANENT MAGNETS

Tungsten Steel Retains Magnetism for a Long Time—Recharging

Seattle, Wash.—Editor Motor Age—Would like some information as to permanent magnets for magneto fields:

- 1—As to the kind of steel.
- 2—As to tempering and hardening.
- 3—As to charging.—P. P. Wade.

1—Tungsten steel appears to be better than ordinary carbon steel for use as a permanent magnet, owing to its ability to retain magnetism for a greater length of time. The percentage of tungsten in the steel varies according as the hardness desired. The hardness of this kind of steel cannot be increased by the ordinary process of hardening. Carbon steel is also suited for magnets.

2—The addition of the tungsten makes the steel hard. The magnet is given its final shape through hammering at a red heat.

3—The magnet is charged by placing the

ends in contact with an electromagnet and gently tapping the magnet. Rubbing the steel against another magnet will charge it, or holding it near one of the poles of a direct current generator. In other words it may be charged by bringing it into a magnetic field or in contact with another metal which is magnetized.

THE GEARS HOWL IN SLOW SPEEDS

Caused by Increased Pressure Per Tooth—Rim-Cut Tire Hopeless

Grandin, N. Dak.—Editor Motor Age—What kind of transmission is used on the Firestone Columbus model 5,000?

2—What causes the howling in the transmission on first, second and reverse gear? On high gear it runs alright. The gears are in fair shape.

3—If I start the engine when it is cold and let it run for 5 or 10 minutes and then stop it, the gasoline will go back through the carburetor. How can this be prevented? It is a model L Schebler.

4—What can be done for a tire that is badly rim cut although the tread is in good shape. Would an inner liner hold it?—A Reader.

1—The transmission was made by the Warner Gear Co., Muncie, Ind.

2—All intermediate gears will howl, due to the increased pressure per tooth as compared with direct drive. The gears may appear to be in fair shape, but nevertheless, the howling will be heard. This is characteristic of nearly all makes of cars.

3—Condensation of the fuel in the inlet manifold is the cause of the condition. There is no remedy for condensation except to keep the manifold warm enough to prevent the fuel turning into the liquid state and running out through the air inlet.

4—Little can be done for such a tire. The inner liner will help matters, provided it is of the type which completely surrounds the inner tube.

BATTERY IS EXHAUSTED QUICKLY

A Short-Circuit in the Switch the Probable Cause of the Trouble

Ellinwood, Kans.—Editor Motor Age—I have several magnetos and coils, and while the motor is running on the magneto there is short circuit on the battery side. By taking the connection loose on the battery I get a faint spark between the wire and the terminal. It uses up the battery very fast. The coil gives a good spark and shows no signs of weakness. Where is the trouble?—A Reader.

Motor Age suggests you follow the wires leading from the battery, examine the insulation carefully for breaks, take the switch apart and see that nothing is touching the battery connector when the switch is thrown on magneto side, and in general inspect everything connected in any way with the battery circuit. Do not allow a high-tension wire to rest against any of the low-tension wires, and if possible, keep all the wires separated. The most probable location of the short circuit is in the switch or possibly at the bottom of the coil. Here the battery wire may be touching two terminals, one a primary winding and the other a ground terminal.

Gear Ratio and Power of Car

Deer Creek, Okla.—Editor Motor Age—which of two cars, one geared 4 to 1 with 32-inch wheels and the other geared 3½ to 1 with 30-inch wheels has the more power on high?

Questions Answered and Communications Received

F. K. Miller.....	Chillico, Okla.
E. D. Richmond.....	Charlottesville, Va.
J. C. Dester.....	Deer Creek, Okla.
L. R. Davis.....	Parsons, Kan.
P. P. Wade.....	Seattle, Wash.
H. P. Blaisdell.....	Harbor Springs, Mich.
A Reader.....	Grandin, N. D.
A Reader.....	Ellinwood, Kans.
L. L. Doyel.....	Sacramento, Cal.
G. W. Madere.....	Reserve, La.
L. Smith.....	Portland, Ore.
Malcolm Dougherty.....	Baton Rouge, La.
W. H. Craig.....	Alameda, Cal.
D. M. Hunter.....	Viola, Wis.
A Subscriber.....	Paris, Ky.
A Subscriber.....	Corning, Ia.
C. S. Hitchins.....	Hitchins, Ky.
H. C. Hearne.....	Gulfport, Miss.
W. G. Roth.....	Roaz, Wis.
R. W. Tavermer.....	Catawba, O.
G. Selfelt.....	Gary, Ind.

No communication not signed with the reader's full name and address will be answered.

2—What causes a Stewart revolving dial speedometer, after getting to the 35-mile mark to go backwards. Keeping the throttle constant, the dial was noticed to recede from 35 to 20 without any decrease in the speed of the car.—J. C. Dester.

1—The question is hardly answerable as the motor installed in the car plays as big a part in the car's ability as the gear ratio. The car geared 4 to 1 under ordinary conditions might show better pulling power on grades when the grades are taken at ordinary speeds, providing the $3\frac{1}{2}$ to 1 car has the same motor installed. The $3\frac{1}{2}$ to 1 car would give greater speed for a given throttle setting.

2—A broken jewel would bring on such a condition.

HOW TO TELL WELL-GROUND VALVE Seat and Face Should Present an Even Gray Color

Portland, Ore.—Editor Motor Age—I have used Prussian blue, kerosene and oil, but have never been absolutely sure of having a perfect seating valve. How can one tell when the valve is ground perfectly.

2—Is it well to burn water through the carburetor after and in the same method as kerosene to loosen carbon from the motor?

3—Will concave pressed glass throw better light than straight or plain glass as used in electric headlamps?—L. Smith.

1—As to ascertaining when a good seating is obtained in grinding valves, the method usually employed and the one which seems to give best results is to clean off the valve and its seat with kerosene after grinding and if the ground surfaces present an even gray finish without any black marks which indicate pits, the valve may be considered finished.

2—This method is employed sometimes for carbon removers, but not so generally and usually not so successfully as if kerosene is employed.

3—It is doubtful that concave pressed glass will effect enough improvement in the headlights to make up for its greater cost. Glass lenses with a plain inner surface and a convex outer surface are employed often with good results.

OPERATION OF PLANETARY GEARSET Causes of Overheating of a Ford Car— Grease on the Brakes

Reserve, La.—Editor Motor Age—Is it natural for a Ford touring car with two people in it running at the rate of 33 miles per hour for a distance of 12 miles over good roads to become overheated? The air temperature was 68 degrees and the car was fitted with a hot air pipe. I have recently cleaned my radiator with boiling water and Rub-No-More, as no soda was at hand. The brake bands are not too tight. I have been looking for the cause of this boiling for some time.

2—Grease runs out of both my brake drums. I was told to bore a hole in the housing but I do not like the idea.

3—How does the Ford planetary transmission work. I have read in the columns of the transmission construction, but I want to find out how it works.

4—Is the Leece-Neville starter for Ford cars reliable? Is it worth its cost in service?—G. W. Madere.

1—The Ford car being cooled by the thermo-syphon system, one would naturally look to a clogged radiator or scale on the jacket walls. The mixture should not be too rich. Perhaps the motor is heavily carbonized, for such a condition would cause the water to boil under the conditions you mention.

2—It is not a good idea to bore a hole in the housing. The first thing to deter-

mine is the cause of the oil leakage, which may be due to too much lubricant in the housing. If the proper amount of grease is used the oil washers in the axle housing may be defective.

3—A sectional view of the Ford planetary set is shown in Fig. 3. The driven gear is shown at D. By pressing the low-speed pedal a brake is applied to the drum B, and by doing this the gear F is held stationary and the pinion P rolls upon it. The pinion P1 causes the gear B to turn slowly, which constitutes slow speed. For high speed the whole mechanism is locked by means of the clutch drum C, and the planetary set turns around, but none of the internal parts of it revolve. For the reverse, a brake band is applied to the drum V. This holds the gear L stationary and the pinion K rolls upon it and the pinion P1 causes B to move in the reverse direction.

4—Motor Age has not tested the Leece-Neville starter for Ford cars, but its construction is such as to give satisfactory service. As to whether it is worth its cost depends entirely upon what service is obtained of it.

WHICH IS THE PROPER GEAR RATIO? Most Efficient Motor Speed Considered— To Install New Engine

Baton Rouge, La.—Editor Motor Age—If the gear ratio on a runabout having a four-cylinder motor of 240 cubic inches piston displacement is $3\frac{1}{2}$ to 1, what should be the proper ratio if a six-cylinder motor of 320 cubic inches displacement were installed in the same chassis, without specially having in mind the highest possible speed obtainable, and without considering advantages of the six over the four, or vice versa.

2—Show by diagram the attachment to the rear axle of the cantilever springs on the National six and Willys-Knight.—Malcolm Dougherty.

1—If the car speed is no object the car may be equipped with any gear ratio within limits. The limits would depend upon the speed of the motor. If it be of the slow-speed type, compensation must be made in the gear ratio so that the motor will not labor when the gears are in high. The displacement of the motor does not determine the gear ratio as you seem to think. The method usually adopted in determining the proper ratio is as follows: The most economic gear ratio is that which will allow the motor to perform best on low and high speeds and with the minimum of fuel. The normal speed of the car and the most efficient r. p. m. of the motor must be considered. Suppose the motor is most economical at 800 r. p. m., then since most of the running is done at 20 miles per hour a ratio should be adopted which will make the car travel 20 miles per hour and turn the motor over at 800 r. p. m.

2—This was shown in Motor Age, issue of February 5, page 31.

Glycerine for Windshield

Alameda, Cal.—Editor Motor Age—Referring to Motor Age page 31, issue of February 19 on Keeping the Windshield Clear.

I have used glycerine on the glass windshield for about 4 years with great satis-

faction. I find that by heating the glycerine and applying with a linen cloth, the best results are obtained as there is less lint to stick to the glass. The hot glycerine will spread evenly and will last for about 12 hours in a steady rain. A piece of chewing tobacco rubbed on the glass is also good and can be used when the glass is wet, but will not last as long as glycerine.—W. H. Craig.

WATER IN THE RADIATOR BOILS Circulating System in Good Shape—Valves and Ignition Properly Timed

Viola, Wis.—Editor Motor Age—I have had some trouble with water boiling in the engine of my Michigan 40 1913 model when on a long hard pull. The car is cooled by a centrifugal pump and the circulation of the water seems to be perfect, as well as the ignition system and timing gears. The hood over the engine has no ventilators. Advise me if the cutting of vents in the side would overcome the difficulty.—D. M. Hunter.

If the water is circulating properly and the valves and ignition are timed correctly, one may look to carbon as a probable cause of the overheating. Take the car out on the road and if it shows a loss of power on grades and the motor lags on a pickup, and backfiring is noted occasionally, look to carbon in the cylinders as the cause of the heating. There may be a scale deposit on the water jacket walls which prevents the proper dissipation of the heat. On a long, hard pull the motor is made to do unusual work and will heat a little more than when in ordinary service, but nevertheless, the water should not boil. It would do little good to place ventilators in the hood. Do not run the motor for any length of time with a fully retarded spark, for this causes heating. Keep the oil up to level and do not use too much, as the excess oil tends to form carbon and heat the motor.

DON'T PATCH AN OLD FLOAT It Is Cheaper in the End to Get a New One—A Carburetor Ailment

Paris, Ky.—Editor Motor Age—I have a model O Schebler carburetor on a Buick model 24. In summer with a very weak mixture this carburetor does fine work at all rates of speed. In colder weather, however, when a rich mixture is necessary it loads up and the right mixture seems impossible to be obtained. Should the float be soggy and would varnishing it remedy this trouble? If not, could Motor Age suggest anything to be done? The car runs well at 17 miles per hour and upward.

2—What kind of a car was the Anel in last year's race at Indianapolis?—A subscriber.

The model O is a double-jet carburetor and you no doubt have the secondary jet screw out too far. If the float is gas-logged get a new float. Do not attempt to patch up the old one by varnishing.

2—The Anel was an old Marquette-Buick in new dress.

CARBURETOR TROUBLES READER Can Be Adjusted for Low or High Speed, But Not for Both

Corning, Iowa—Editor Motor Age—What is the bore and stroke of the engine on the Par-tin-Palmer 38?

2—What is the maximum speed of the engine on a Flanders 20?

3—I have a Flanders 20 and have never been able to get the engine to fire properly. It can be adjusted so that it will fire alright on low speed when it is pulling hard, but when it speeds up, it will misfire badly. I can ad-

just it so that it will fire properly on high speeds, but then it will misfire on low speeds. The engine pulls fine when the cylinders all fire. The ignition is good and I took the carburetor off and cleaned it, but this did not seem to help any. Can Motor Age suggest some remedy for the trouble?—A Subscriber.

1—The maker will not give these dimensions for publication.

2—About 1,800 r. p. m.

3—If you are using a double-jet carburetor the trouble may be with improper adjustment of the jets. If you are using a single-jet instrument look to the air valve. See that it does not stick. The spring may be weak. Get a good setting for the fuel nozzle at low speeds and then adjust the air valve for the higher speeds. The valve clearance should be checked over and the gaps in the spark plugs examined. They should be neither too wide nor too close, but about $\frac{3}{32}$ inch.

RELATION OF STROKE TO POWER

Doubling Stroke Gives Motor Twice as Much Displacement

Hitchins, Ky.—Editor Motor Age—When all other conditions are equal, what is the relation between the length of the stroke and the actual horsepower of a motor?

2—In fairly rough service, would wooden wheels give better results than wire wheels on a light car like the Saxon?

3—Which would cost more?

4—What is the weight of the 1914 Studebaker, four, touring car?—C. S. Hitchins.

1—By lengthening the stroke the displacement of the motor is increased and the horsepower increases also. If a 3 by 4-inch motor has the stroke lengthened to 8 inches the displacement is doubled and much more power obtained.

2—Well made wire wheels should stand up as well as wooden wheels; in fact, it has been shown, in some instances, that wire wheels are better able to withstand hard usage than wooden wheels.

3—At present the wire wheels cost slightly more than the wooden, most makers charging a little more than the regular price for wire wheel equipment.

4—2,300 pounds.

WHO BUILT THE FIRST CAR HERE

Dispute Over Credit for the First Successful Vehicle

Catawba, O.—Editor Motor Age—Referring to Motor Age, March 5, page 35. Was it the same size old tire that Maxwell Smith put inside the new ones? Were there and rough places in the tire, or blowout holes?

2—To whom would a person write in Indianapolis to engage tickets for the race May 30? Are there any being sold?

3—Why is it that when one wheel is jacked up the others will not run?

4—How are engines rated on the block tests?

5—Who made the first motor car in the United States? Is there not some dispute over this?—R. W. Tavermer.

1—Maxwell Smith did not state, but it appears he used a smaller tire and a smaller tube. He stated he used old casings, but whether or not they were worn considerably, is not said.

2—Write to the Indianapolis Motor

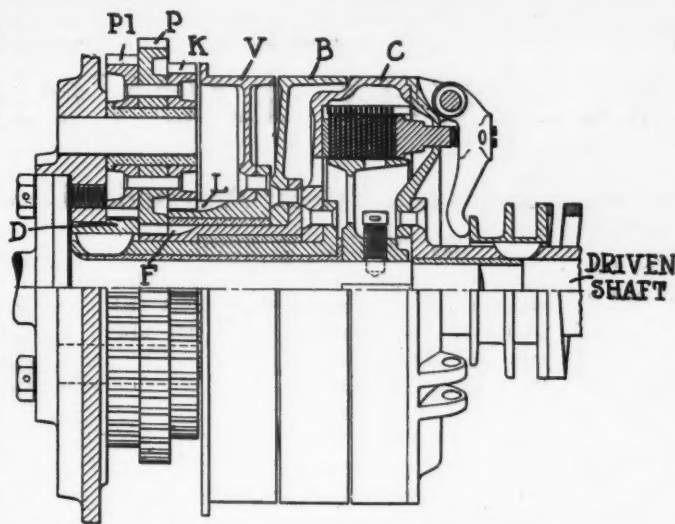


Fig. 3—Section of the Ford planetary gearset showing the various parts. The method of operation is given on the previous page

Speedway, Indianapolis, Ind. Tickets are now on sale.

3—The ordinary differential causes the wheel offering the least resistance to turn and hence the jacked-up wheel gets the power.

4—Engines on test for horsepower are usually given brake ratings. If a motor is rated at 35 brake horsepower it means that the result of a test showed this motor capable of delivering that much useful work at the flywheel.

5—Elwood Haynes claims to have built the first successful gasoline motor car in America. The Smithsonian Institute at Washington has the first Haynes car built.

Factory Output in 1913

Gulfport, Miss.—Editor Motor Age—Who was the largest builder of six-cylinder motor cars in the United States in 1913?

2—How many Oakland cars were made in 1913?

3—How many Hudson cars were made in 1913?

4—What make of motor do the Imp and Falcon cyclecars use, and what are the maximum speeds of these cars? Also the Steco.—H. C. Hearne.

1—It is impossible to state which one of a number of makers was the largest maker of six-cylinder motor cars for 1913.

2—Approximately 8,000 Oakland cars were built during 1913.

3—About 7,000.

4—The Imp cyclecar employs the Spacke motor, the Falcon the Wizard, and the Steco the Mack motor. The maximum speed of these is about 45 miles per hour.

MOTOR HAS A PECULIAR KNOCK

Probably a Loose Wrist Pin—Proper Size of Carburetor

Roaaz, Wis.—Editor Motor Age—I have a 1913 Marion 37A which is giving some trouble. It has a peculiar knock which I am at a loss to locate. It seems to be plain when the motor is running idle at low speed and can be felt very plainly on the intake manifold. I have looked at the connecting rods and found them to be all right. Can Motor Age suggest anything?

2—Have also had some trouble with the carburetor on this car. It is equipped with a Rayfield carburetor, which, no matter how it is adjusted, will load up and commence to miss fire. What is the proper style and size of Rayfield that should be used on this car?—W. G. Roth.

1—You do not give enough characteristics of the knock. A loose wrist pin will knock regularly at slow motor speeds and the density of the sound will increase as motor speed becomes greater. One of the connecting rods may have side play at the lower end bearing or the piston may be worn considerably. A valve stem may be bent. Open the throttle wide for a few seconds and then suddenly close it and note if the knock becomes clearer. If it does, this is a fair indication of a loose part. Is the knock of a sharp metallic character or is it dull?

2—The carburetor probably is completely out of adjustment. Only experienced hands should attempt to set the adjustments.

Start the motor and cut down on the fuel supply until the motor operates at its best speed with the throttle about $\frac{1}{4}$ open. The proper size Rayfield for the Marion 37A is a $1\frac{1}{4}$ -inch model A3 special. When writing to the maker concerning this instrument, state specifically it is installed on a Marion 37A.

WANTS TO INCREASE CAR SPEED

Will Lighten Reciprocating Parts—E-M-F Speed Record

Gary, Ind.—Editor Motor Age—I have a 1911 roadster model E-M-F. I can only get a speed of 62 miles per hour. Kindly explain how I can gear this car up to maintain greater speed. Will a ratio of $2\frac{1}{2}$ to 1 be too high for track work?

2—What speed record has been made by an E-M-F?

3—Is it a good idea to take the lower piston ring off?

4—Will it increase the speed if the pistons and connecting rods are made lighter? I wish to gear the car as high as possible.—G. Seifert.

1—A speed of 62 miles per hour for such a car is considered excellent, but you might obtain higher speed by using a lower gear ratio. A $2\frac{1}{2}$ to 1 ratio would show good results.

2—The A. A. A. in its report of November, 1913, gives the E-M-F., with Witt as driver, the 4-mile record of 3 minutes 49 seconds for cars of 161 to 230 cubic inches piston displacement. The record was made in 1910.

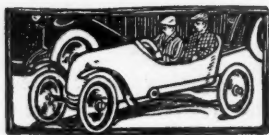
3—Some do this and claim it gives better results, because it decreases friction.

4—The speed would be increased if the rods and pistons are made lighter.

Denominator of Horsepower Formula

Sacramento, Calif.—Editor Motor Age—In figuring the horsepower of a gas engine, what is the 2.5 that is used? Are they all figured on a 1,000 ft. piston travel?—L. L. Doyel.

The denominator is known as a constant and is a figure which has been found to give the best results at 1,000 feet per minute piston speed for all motors. When the formula was adopted by the A. L. A. M., the motors in use were of the short stroke type or of the square type and the formula was gotten up and a suitable denominator found which would give the correct result for all types of motors.



Cyclecar Development

Some New Models and Cyclecar Accessories Described

A HALF a dozen new cyclecars have been announced within the last few days, several new cyclecar motors and a number of new accessories which will have a direct influence on cyclecar development.

Among the cyclecars are the O-we-go, the Bantam, the Beisel, and the Columbia, with the Saginaw and Euclid announced a short time ago. In the motor field the Wizard company is announcing a new power plant, the Euclid firm is building a new motor for its cars, and the Ives Motor Co., and the Motor Products Co. of Detroit, are putting out motors especially for cyclecars, these motors being of the V air-cooled type, except the Euclid.

The O-we-go cyclecar is a tandem 36-inch tread machine, with friction-belt transmission and long belts used to get the maximum efficiency out of this type of transmission. For comfort the cantilever type of spring is used on the car throughout and is said to give wonderful results.

This car is fitted with a V-type motor, this having a bore and stroke of 3 $\frac{3}{4}$ and 3 $\frac{3}{4}$ inches respectively. The friction transmission is also of a new construction, though standard arrangement is used. The face of the motor flywheel forms the

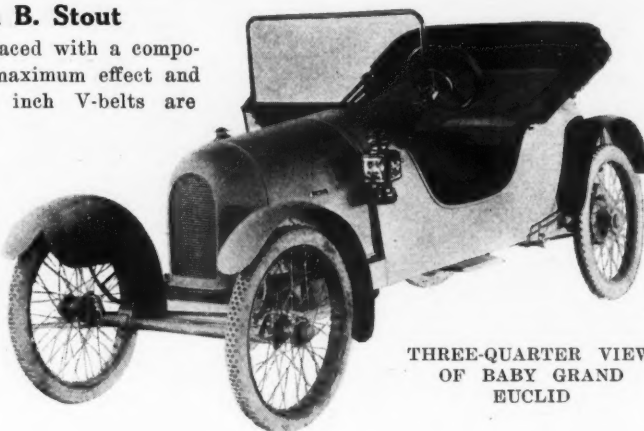
By William B. Stout

friction plate and is faced with a composition metal to give maximum effect and efficiency. One-eighth inch V-belts are used for the final drive. The change-speed lever is mounted on the steering post directly under the steering wheel and in a very handy position for immediate use in emergencies. A foot throttle is fitted.

The car is furnished with battery electric lighting. The factory is located at Owego, N. Y. The car shown in the illustrations has been on the road for 3 months. The price is set at \$385.

Columbia, a Seattle Product

Another car which has been mentioned is the Columbia, to be made in Seattle, Wash. This car is a side-by-side machine, having 96-inch wheelbase and 40-inch tread, and is fitted with a V-type overhead-valve motor. Friction transmission with belts furnishing the drive, and the



THREE-QUARTER VIEW
OF BABY GRAND
EUCLID

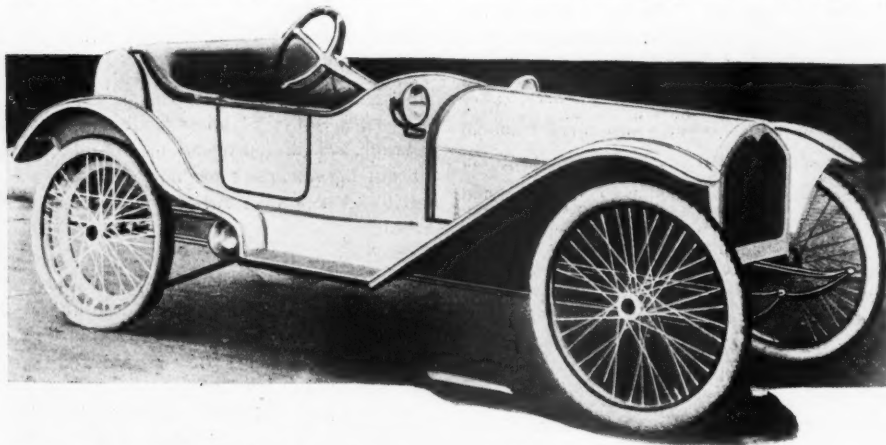
lines of the car are especially good. It is stated that the factory is all equipped for work, and deliveries are being delayed only by shipments of parts from the east. A front-wheel drive car is being experimented with for future production.

The Bantam is a light motor car announced from Boston, and is a side-by-side type. It has an 86-inch wheelbase and a 46-inch tread, and will be fitted with a V-type air-cooled motor. Friction is used for speed-change, and the entire transmission is said to be noiseless.

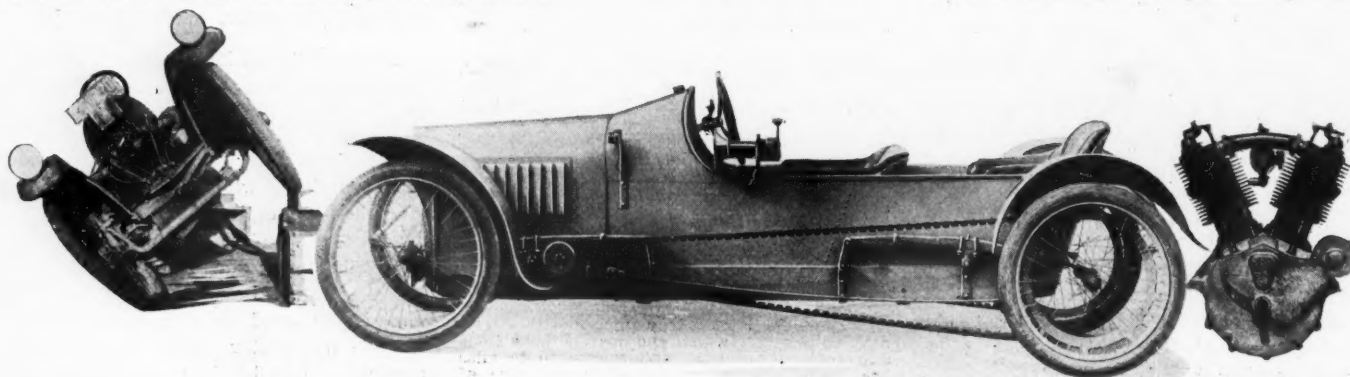
Beisel Made in Toledo

The Beisel cyclecar is to be built at Toledo, according to present plans. This car also is a side-by-side machine having a 40-inch tread. It is to be driven by a four-cylinder water-cooled motor of 2 $\frac{3}{4}$ by 4-inch cylinder dimensions, which make it a light car in classification. Equipment will consist of mechanical starter, top, windshield, and electric lights. The car will list at \$475.

The Euclid light car, from the design of E. S. Cameron, of motor car fame, has been described previously. This machine has a four-cylinder air-cooled motor with overhead valves set sideways in the combustion chamber, and operated by long



COLUMBIA CYCLECAR TO BE MADE IN SEATTLE



TO THE LEFT, THE SAGINAW BEING TESTED FOR TIPPING. CENTER, THE O-WE-GO. TO THE RIGHT, THE IVES CYCLECAR MOTOR

rocker arms from the camshaft at the side of the cylinders. The car itself follows motor car practice, with sliding gear-set, shaft, bevel and differential to live rear axle. The wheelbase is 100 inches, the tread 40 inches.

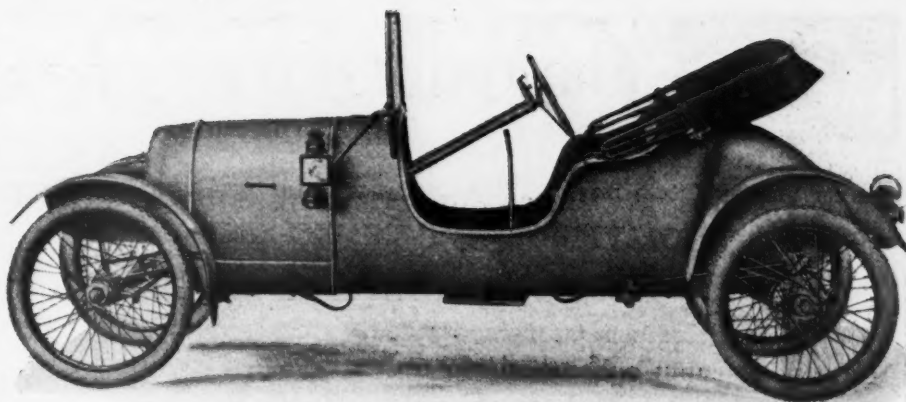
The Saginaw cyclecar is being made by the Valley Boat and Engine Works, of Saginaw, Mich. This interesting little machine is a 36-inch tread tandem, with a V air-cooled motor and friction-belt drive. The friction disk is 12 inches in diameter, the wheel 14 inches. A 100-inch wheelbase is used.

New Wizard Motor

In the line of motors the Euclid four has been described. The new Wizard with Atwater Kent ignition, is shown in a separate reproduction. This motor follows standard overhead valve motor practice and is fitted with a fan at the front to give proper cooling when standing still. This fan is two-bladed and of the aeroplane type. An outside flywheel is fitted if desired.

The M. P. C. cyclecar motor is a newly announced power unit, somewhat smaller in bore and stroke than the average, but said to be very powerful. The bore is $3\frac{1}{4}$, the stroke 3.6 inches, giving from 9 to 11 horsepower by brake test. The motor shown is fitted with magneto, but other ignition is stated to be optional.

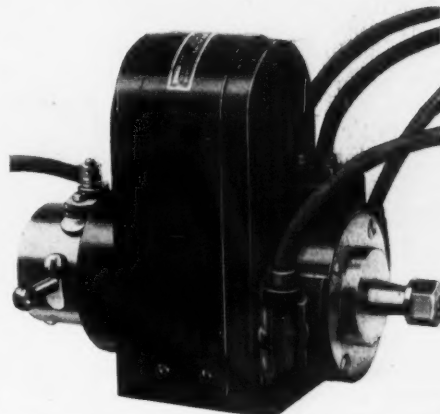
The Ives cyclecar motor, as being built for cyclecar use, and used by a number of cyclecars, is shown in an accompanying illustration. This motor has the valves in a single pocket at the side of the cylinder, the inlet being over the exhaust and operated by an overhead rocker arm, as shown.



SIDE VIEW OF EUCLID, DESIGNED BY E. S. CAMERON

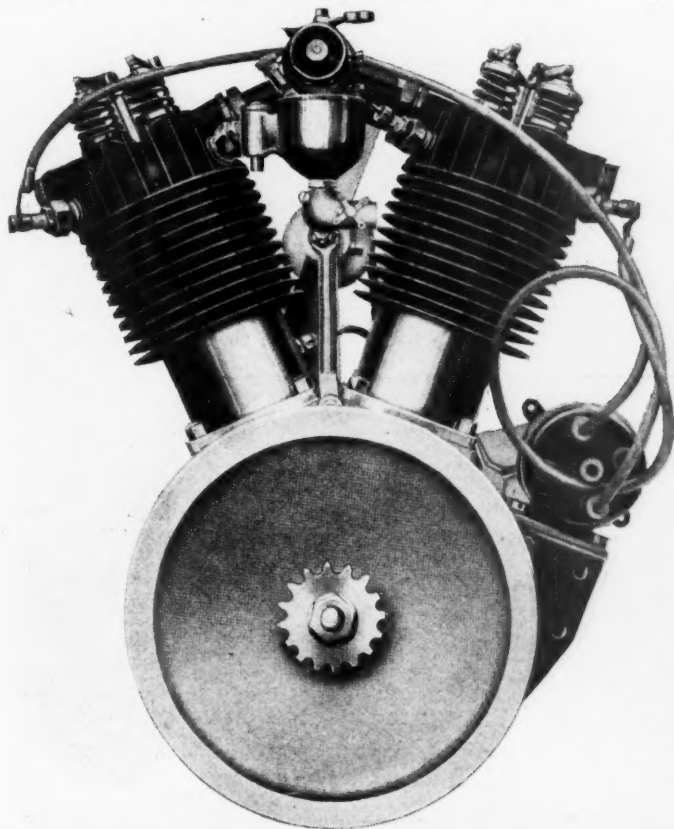
In the line of lighting the new Vesta lighting-and-ignition set operating on the 2-volt system is especially ingenious. The writer has used this outfit on a cyclecar for some weeks and has yet to find any trouble with it. The generator is about the size of a motorcycle magneto, and drives from the motor shaft by a small belt with a 2 to 1 reduction. This charges a single cell 2-volt storage battery on the running board which in turn supplies a tail light, two small side lights and an 8-inch headlight. A 2-volt coil, so that the battery can also be used for ignition with the Atwater Kent timer now on the car, is now being fitted, when the dry-cells will be thrown away. The 2-volt coil will be a part of the set sold by this firm for cyclecar ignition and lighting combined.

In the line of ignition is illustrated the

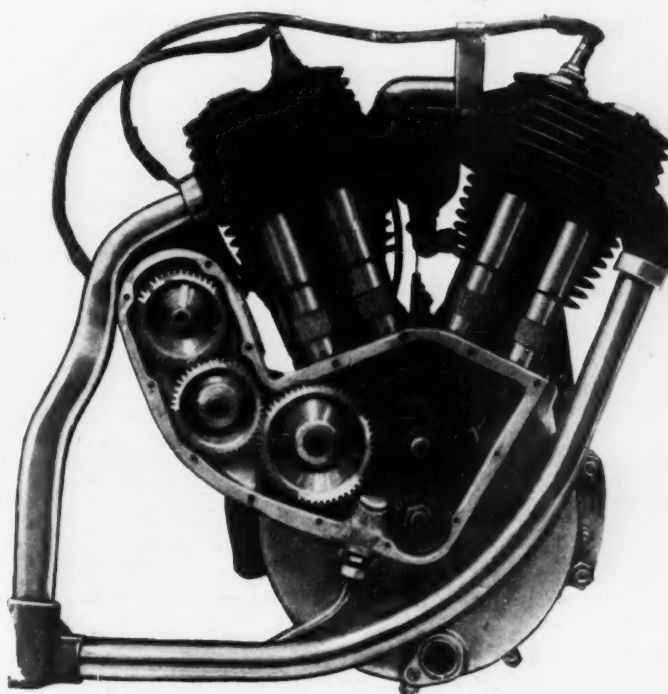


NEW BERLING MAGNETO FOR CYCLECARS

new Berling dual magneto for cyclecars. This magneto is built for the V type motor, but, as is known, the starting of a V motor presents difficulties which demand battery for this period. With the Berling the batteries are used for starting and the magneto switched on after the motor is under way.



STYLE B WIZARD MOTOR



MOTOR PRODUCTS CO. MOTOR



The Realm of The Commercial Car



French Army Officials Try Out Four-Wheel Drive



SCHNEIDER TRACTOR WITH MOTOR IN CENTER AND PANHARD LIGHT TRACTOR WITH KNIGHT MOTOR

FOUR-WHEEL drive tractors appear destined to replace horses in the various artillery regiments of the French army. Careful experiments have been carried out during the past 2 or 3 years, big guns have been hauled by gasoline tractors in the annual military maneuvers, private cross-country tests have been undertaken, and the general results have been so satisfactory that the army already has secured a number of all-drive tractors and considers the moment opportune to hold a competition among the various makers with a view to supplying these tractors in big quantities.

French Fleet of Lorries

It is not intended to make any change, at any rate for the present, in the general use of motor lorries for bringing supplies to troops in the field. The French army maintains a substantial fleet of 3 and 5-ton lorries, and has a big supply of privately-

By W. F. Bradley

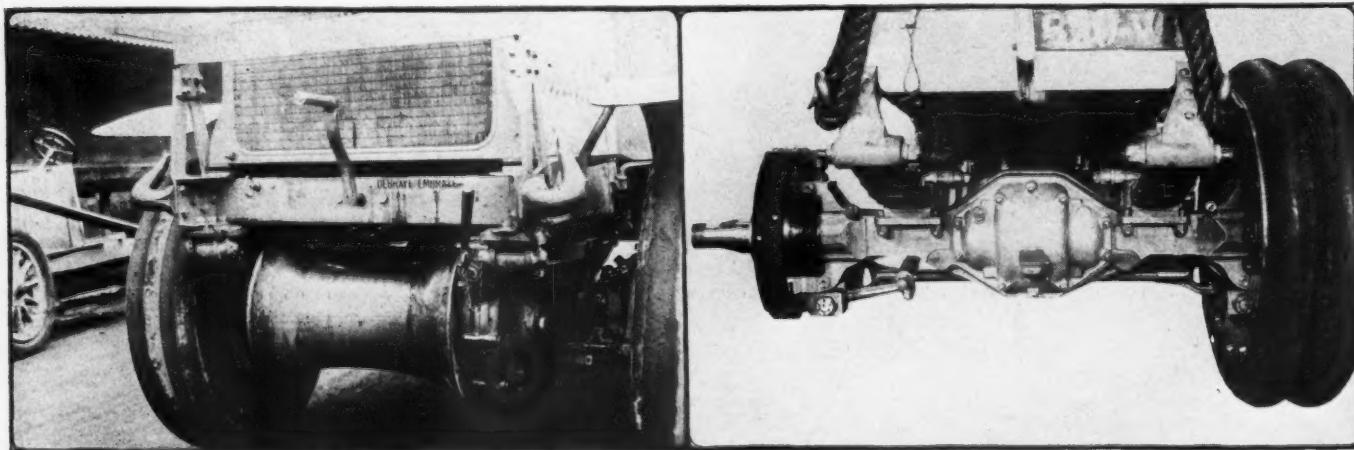
owned vehicles from which it can draw under its subsidy scheme, as necessity arises. The all-drive tractor probably will have an important commercial development, but its first and most serious application must be with the army. Heavy field artillery calls for the use of vast numbers of horses with their attendant inconveniences. Sufficient experimental work has been done to show that a tractor driving on all four wheels can haul loads into any position accessible to a horse team, that it can travel faster and is more reliable than animals.

This competition, the first of its kind in Europe, opened in the military town of Rheims and was purely military. The public was not admitted and no information was given out to the press. Two types of tractors were provided for—heavy tractors

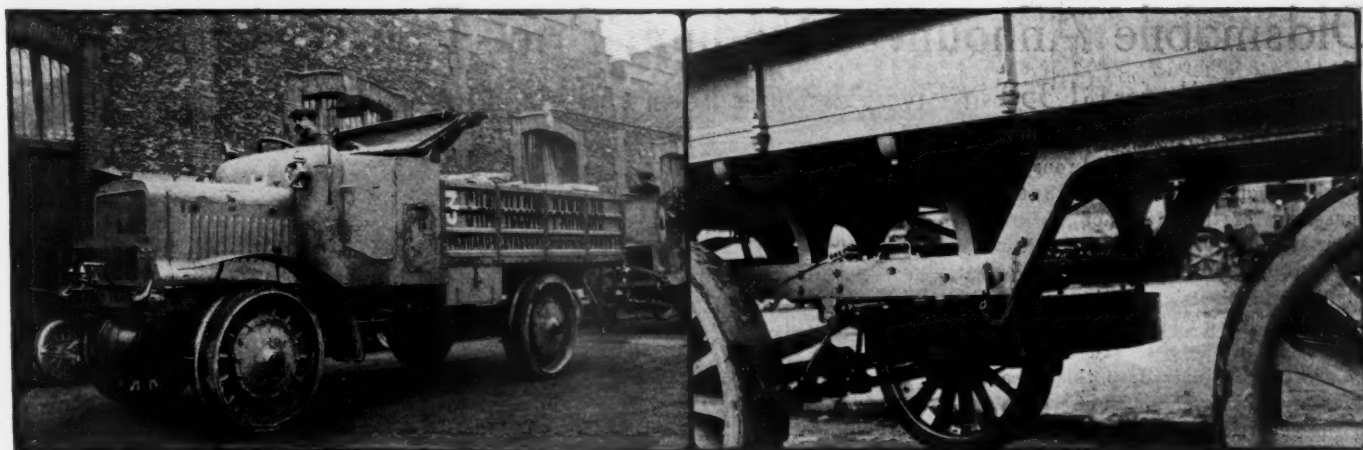
hauling a load of 15 tons, and light tractors with 8 tons in tow. In the first class the dead weight of the tractor was limited to $5\frac{1}{2}$ tons; in the light section the weight was $3\frac{1}{2}$ tons. A minimum useful load of 2 tons had to be carried on the tractors, the total weight being limited to $7\frac{1}{2}$ and $5\frac{1}{2}$ tons for the light and heavy tractors respectively. All the tractors presented in the competition adhered to these weight limits very closely.

Mechanical Details

While fixing the general lines of construction, manufacturers were given a free hand in mechanical details. Four-cylinder motors were obligatory, the cooling system had to be very efficient, all machines had to have a capstan or windlass, the rules for the interchangeability of parts were based on those governing the ordinary army trucks, a definite standard was given for tire sizes, and makers were



WINCH ON PANHARD HEAVY TRACTOR AND BRAKE MECHANISM ON RENAULT TRACTOR



PANHARD HEAVY TRACTOR WITH POPPET-VALVE MOTOR AND LATIL TRAILER SHOWING SPARE WHEEL CARRIED UNDER BODY

warned that their vehicles would be severely tested on hills, across country, fording streams, climbing over obstacles, etc.

Six firms entered the trials, but two of them were unable to be ready in time, leaving the actual competition in the hands of Panhard-Levassor, Renault, Schneider, and Latil. Two light and two heavy models were presented by Panhard-Levassor, the machines being built under Chatillon license; Schneider put in a couple of heavy type, Renault did the same, and Latil had two of each. Thus the competition united twelve tractors, each one having two trailers.

Making the Awards

Many factors are taken into consideration in determining the awards in this competition. There is no doubt as to the ability of the machines to maintain the average speeds imposed over the various classes of roads and to climb all the main road hills. Economy in fuel and oil will be considered throughout the entire competition, and in addition there will be 2 days exclusively devoted to fuel economy tests. In addition to gasoline, alcohol and benzol have to be employed. The determining test will be the ability of the tractors

to operate across country, to ford streams, and to haul their trailers over hills by means of the capstan where it is impossible to proceed with the trailers directly in tow. Some of this cross country work will be done on land of a boggy nature, where it will be necessary for the tractor to haul itself along by means of the capstan and cable.

It is because of this special work that very close attention has been paid to the detail equipment. In every case provision has been made for the quick attachment of chains to the road wheels. Renault has hooks which can be screwed into the inner face of the rim, on left and right hand side, allowing chains to be attached to them and run round the tires. Panhard has several types of chains according to the various road conditions met with. In addition to the chains, all the competitors carry special ribbed rims to be attached to the wheels where traction cannot be obtained with ordinary means.

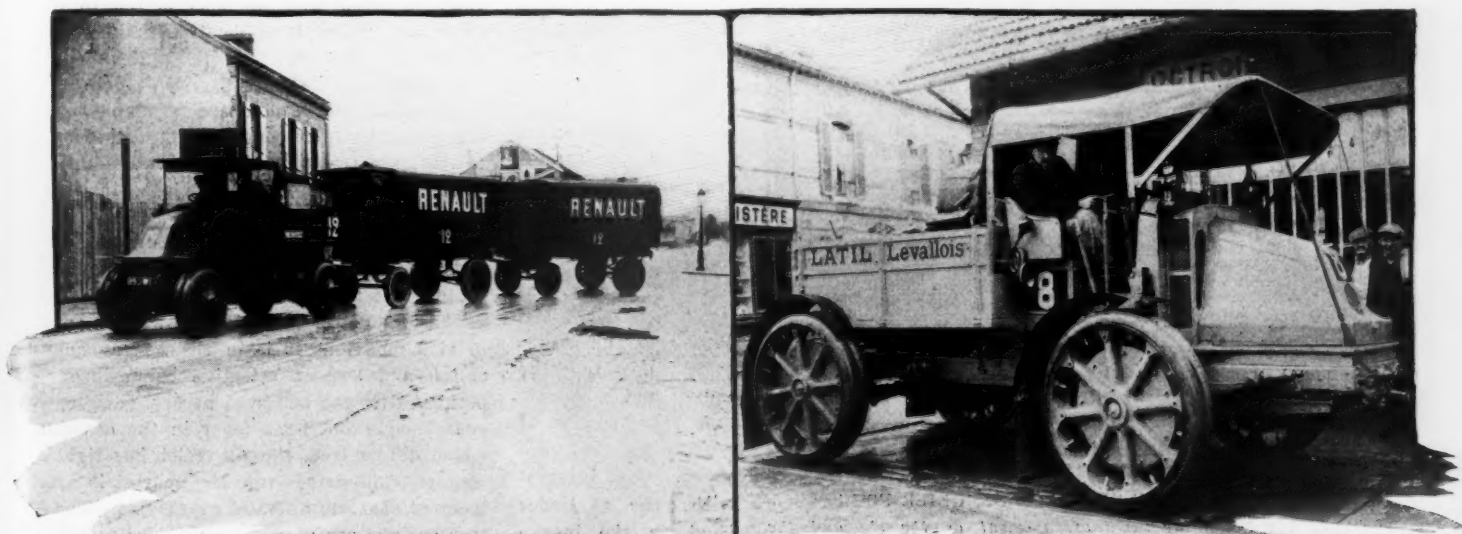
The Capstan Equipment

In most cases a single gear is used for the capstan. Schneider employs four, corresponding to a speed of cable of 11 inches, 23 inches, 39 inches, and 70 inches per second. A manilla cable is used having a

diameter of 1.5 inches, a breaking strain of $9\frac{1}{2}$ tons, and a weight of 2.7 pounds per meter. In order to secure better adherence of the tractor when making use of the capstan, Latil has two anchors under the rear of each frame member. These anchors really consist of universally jointed struts with deeply-ribbed feet, capable of being put into the ground in any required position. When not in use, they are held under the chassis by means of a chain.

Trailers Classified Separately

Trailers also come in for special attention and are the subjects of a separate classification. With the exception of one of the light Latil models, all the trailers are mounted on steel bandages. Latil also has one of his tractors with a universally mounted front axle, while the others are of the ordinary wagon type. Each trailer has a brakesman in front and a platform body with detachable sides, the whole covered over with a tarpaulin. There is a protective hood for the driver, also for the men on the trailers. Very few spares are carried on the trailers. Latil has taken the precaution of fitting a spare wheel, which is mounted under the frame, as is shown in the illustration.



RENAULT TRACTOR AND TRAILERS AND THE LATIL LIGHT TRACTOR

Oldsmobile Announces Medium-Price Four-Cylinder Car

Sells for \$1,350 in Five-Passenger Form and Has Overhead-Valve Motor

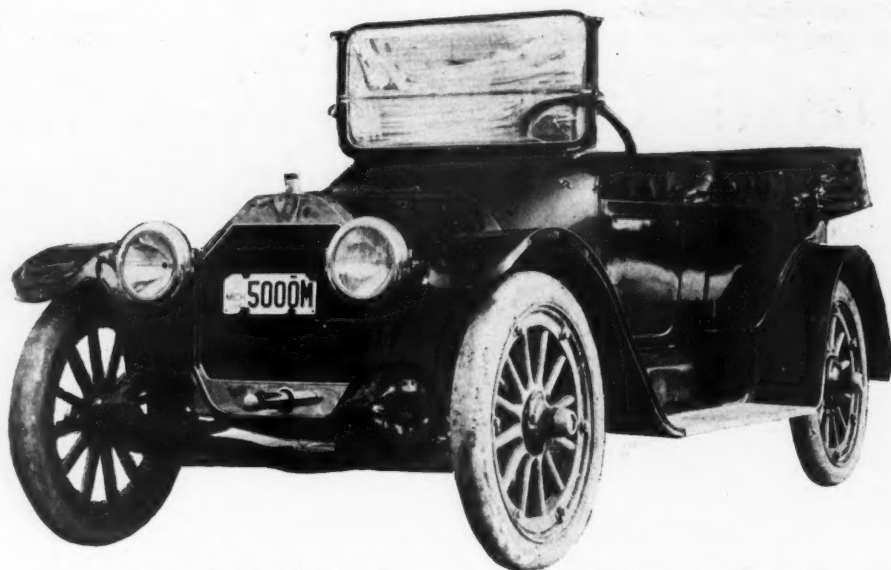
A NOTHER step was made in the re-establishment of the four-cylinder car as a popular vehicle, with the announcement of the Olds Motor Works, of a four-cylinder, five-passenger car, which is to sell at \$1,350 with full equipment, including an electric starting and lighting system. The Olds company has marketed fours in the past and only until a few years ago did it drop this type and manufacture sixes only. In offering a reason for the reinstatement of the four an officer of the company said the demand from dealers and owners over the country has practically forced the concern to bring about the addition to the line.

In general appearance the new four is identical with the six, in fact the finish of both four and six and the material of the body is exactly the same. The four, however, has left drive and center control and no sidelights used, but instead, small lights are incorporated in the headlights. These are to be used for city driving and the high-candlepower bulbs for the country. The only difference structurally between the two cars lies in the motor, the other parts of the four being of the same design but proportionally smaller than in the six.

Graceful Body Lines

The lines of the car are somewhat more graceful than on the six, due to the cowl design, which slopes a trifle more toward the hood. The cowl dash is of circassian walnut and all the instruments are set flush, and may be illuminated by a light suitably placed.

The new motor has block-cast cylinders of $3\frac{1}{2}$ by 5 inches bore and stroke giving an S. A. E. rating of 19.6 horsepower, but on the block the engine developed over 33 horsepower it is claimed. The main feature of this motor is its economy in fuel, and if a recent test at the factory is taken



NEW OLDSMOBILE FOUR-CYLINDER FIVE-PASSENGER TOURING CAR

Showing left drive and center control, clean running boards and general refinement of the body. This car is a replica of the six-cylinder except for the motor used, which in this case is of the block-cast valve-in-head type

FEATURES OF OLDSMOBILE FOUR

*Valve-in head motor
Removable cylinder head
Delco cranking and lighting system
Left drive and center control
Running gear design like the six
Wheelbase 110 inches
Price \$1,350 for five-passenger, with equipment*

as final, the car will show 22 miles per gallon of gasoline. In other tests 17 and 18 miles were obtained which may be considered a fair average in the hands of an owner.

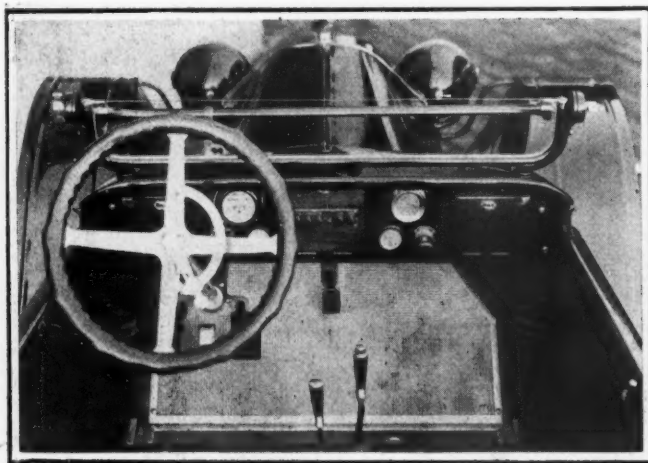
exhaust is bolted to the casting. The applied head is easily removable as is the head cover which is held in place by thumb nuts.

Details of the New Motor

To assist in the quiet operation of the car the timing gears have been cut in helical form and well fitted couplings provided for the driving of the motor equipment. Water circulation is assisted by a centrifugal pump and lubrication is by splash. The Delco 6-volt, combined ignition, starting and lighting system is used as in the six-cylinder, and the dash appearance of the controls also is the same. When the hood is lifted on this new car no moving part is seen and the clean lines and accessibility of the motor should be appealing to the buyer. A Marvel carbureter is fitted, and the fuel is fed to it from a 12-gallon tank located in the rear of the car.

A sturdy crankshaft is suspended by three points and is mounted on ample-size bearings, the entire engine being fastened to the main frame by three points. Lubrication is by combination splash, in the aluminum crankcase, and pressure. The motor just described was designed by Oldsmobile engineers and is being manufactured at the Olds works in Lansing.

The unit power plant idea is worked out in this model as it is in the six, a cone clutch and 3-speed selective being incorporated with the motor. The change-speed gear is operated by a lever in the center which differs from the six which has right control. The drive from the gearset is by inclosed shaft to a floating rear axle. The rear springs are $\frac{3}{4}$ elliptic and are under-slung, this method being adopted only a



DASH VIEW OF THE OLDSMOBILE FOUR

The cowl board has the same arrangement as the six and the body is said to be of the same material and of the same finish as the larger car

The motor valves are $1\frac{1}{8}$ inches in diameter and are set vertically in a removable cylinder head, the entire valve mechanism being inclosed by an aluminum housing which subdues all noise and makes the motor almost as quiet as the six. Push rods and rocker arms operate the valves and a simple and new means of adjustment is provided. Cast integral with the cylinder head, is the intake manifold, while the

short time ago in the six-cylinder car.

The five-passenger Oldsmobile has a wheel-base of 110 inches, has 33 by 4-inch tires all around and leaves the factory fully equipped at the price quoted. In the list of appurtenances appears Jiffy curtains, the same Fabrikoid top as used on the

six, windshield, speedometer, 8-day clock, tools and a two-tire carrier at the rear of the chassis.

The car has a 10½-inch road clearance and is claimed to weigh less than 2,600 pounds with the equipment. Orriford lake or Brewster green painting is offered.

Details of New Benham Six

Made Up of Parts of Known Quality

DETAILS are now at hand regarding the Benham six, the product of the Benham Mfg. Co., Detroit, Mich., whose formation was announced some time ago. According to officers of the concern, the idea underlying the design of the new product was to make up a car from the products of high-class parts manufacturers, to make the car a combination of units that are widely and favorably known among dealers and owners. The intention is to avoid any unknown or untried unit but to assemble standard parts in such form as to give maximum service at minimum expense.

With this object in view the designers have employed a Continental motor, a Brown-Lipe four-speed gearset and disk clutch, Spicer universals, Timken front and rear axles, Bosch ignition, Master carbureter, Empico speedometer drive, Brewster fenders and Goodwin bodies.

Three body styles are fitted upon a single chassis of 130 inches, a roadster and a five-passenger touring at \$2,485 and a seven-passenger model at \$2,535. The equipment includes a special electric lighting and starting system, a one-man top, Warner Autometer, two thermos bottles, cigar lighter, etc. The stock wheels are of the regular wood type, fitted with Goodrich 34 by 4½ tires. Rudge-Whitworth wire wheels are supplied at extra cost. The weight of the car, equipped and with tanks full, is given at 3,600 pounds.

To take up the various standard units more in detail, we will begin with the engine. This is the Continental 6-48 six-cylinder motor which has 3¾ by 5¼ L-head cylinders cast in sets of three. The power plant is a unit combining the motor, clutch, gearset and electric starter and is suspended at three points to prevent undue strain on any part of the frame and modify the strains on the crankcase. Lubrication is a circulating feed, constant-level splash-system.

In the clutch, steel disks alternate with raybestos-lined disks to prevent heating, and all adjustment features are accessible. Direct drive is on fourth speed in the gearset, which is geared 3⅞ to 1 and will give a car speed of 40 miles per hour at a motor speed of 1,360 r. p. m. The motor will stand a speed of 2,000 r. p. m., it is stated. The use of the fourth speed as direct has several advantages in the mind of the designer, who believes it permits a larger and stronger driving pinion, and

also offers features of economy. Inasmuch as the engine is turning one-third slower than if driving direct on third with a 4 to 1 axle, gas consumption should be from 20 to 25 per cent less, according to the designer. In fact, a mileage of 15 miles per gallon is claimed for the Benham six.

The Timkin axle is of the floating type. Brakes are contracting and expanding on the wheel drums. Springs are underslung and riding qualities are enhanced further by exceptionally deep upholstery, the cushions slightly inclined.

Bodies are of the modified streamline type and the lines are low and racy.

Running boards are clean, though spare tires are carried on the fenders in front of the fore doors. The gasoline tank is suspended at the rear, the fuel being fed by pressure to the Master carbureter, which made such an enviable record at the Santa Monica races recently. Controls are grouped conveniently on the dash and the steering wheel is on the left.

MOTOR OUTLOOK IN MEXICO

Chicago, March 26—H. Geoffrey Fletcher, special representative in Mexico of the American Motors Co., states in a letter to Motor Age, under date of March 3, that the demand for Yankee cars in Mexico, as shown by his sales, is more than manufacturers realize. In his letter Mr. Fletcher states:

"As you may readily imagine trade conditions here, at the present time, are extremely adverse, owing to the continued revolutionary trouble, increased duties and diminished value of Mexican currency and the enormous property losses sustained by the haciendados, or ranchers,

who form a large proportion of the buyers.

"I have, however, in spite of the continued upheavals, placed in the republic during the past 2 years over eighty-six American cars which, with the normal conditions would undoubtedly be near the 300 mark right now, as the American car possesses qualities which make it particularly suitable to the conditions here."

Few American makers have turned their attention to Mexico as a field for selling their cars, but it is hoped that with the quelling of the uprisings, trade conditions will resume their normal standing and a heretofore unworked territory will be opened to our makers.

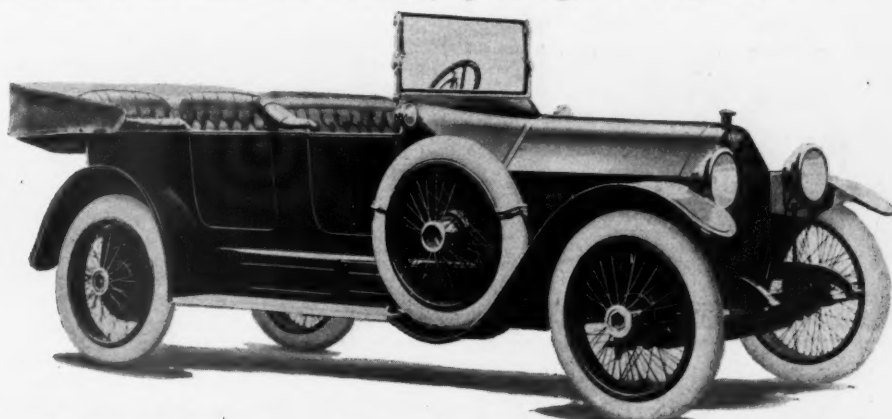
MOTOR CARS IN NEW MEXICO

Santa Fe, N. Mex., March 26—There are only 1,699 motor cars in the state of New Mexico, or one car to every 200 inhabitants, according to figures given out by Secretary of State Lucero. These cars represent 110 different makes scattered over 183 cities and towns. The Ford leads with 530 cars; the Buick is second with 252, Studebaker third with 152, and Overland fourth with 123. The other makes are all under the 100 mark.

Chaves county leads in the number of cars, having 361, which is six times as many as Santa Fe county, which has about the same population. The other leading counties are Bernalillo, 219; Grant, 161; Eddy, 138; Socorro, 106; Dona Anna, 80; Luna, 89; Lincoln, 40; Roosevelt, 30; Curry, 28; Quay, 27; McKinley, 22; Otero, 17; Guadalupe, 10; and Sierra, 8. The leading towns, with the number of cars, are: Roswell, 309; Albuquerque, 215; Deming, 83; Silver City, 79; Las Cruces, 57; Carlsbad, 51; Artesia, 43; Magdalena, 38; Socorro, 29; Clovis, 27; Portales, 21; Hagerman, 20; Tucumcari, 20; Carrizozo, 17; Lordsburg, 15; Alamogordo, 1; Santa Rita, 11; Hope, 10; and Mesilla Park, 10.

SUES ON WINDSHIELD CASE

Cleveland, O., March 30—Suit has been entered in the United States district court by William B. Hanlon, James R. Wardrop and W. P. McFarlane, secretary of the Anderson Electric Car Co., against the Rauch & Lang Carriage Co. of Cleveland, alleging the latter firm is infringing on patent rights to a windshield.



NEW BENHAM SIX-CYLINDER CAR, THE LATEST PRODUCT IN THE \$2,500 CLASS

Two Clutch-Operated Mechanical Gearshifts Announced

Vanderveld and Lewis Devices May be Placed on Old Cars

THE Grand Rapids Show Case Co., Grand Rapids, Mich., announces a new gear-shifting device which is operated by movement of the clutch pedal. A. Vanderveld, of the above mentioned concern, is the inventor of this system which permits of the operator contemplating a gear shift much the same as in the Vulcan electric gearshift. In the latter case solenoids are used to pull the desired gears into mesh while in the Vanderveld system the entire operation is done mechanically.

The control device consists of a number of buttons properly housed, there being as many buttons as the speeds call for. Pressure on a button means the next time the clutch pedal is depressed the gears representing the speed marked on the button will be in mesh. This system is applicable to old as well as new cars for both three and four-speed gearsets. The construction and operation of the apparatus follows:

Push is applied to the fingers C and D in Fig. 1 by a sliding member E actuated by the clutch pedal through a pin and roller shown at F.

The fingers C and D and two that are not shown, are brought into the path of the sliding member E by pressure on the selector buttons mounted on the steering wheel. These buttons are connected to the fingers by rods, one of which only is shown at G. When a button is pressed the corresponding rod is moved. The resulting movement of the lever H, which

is pivoted at J, pushes the proper finger into the path of the slide E, so that when the clutch pedal is operated the movement of the pedal results in the shifting of the desired gear.

When a button is pressed and a rod, as G, moved, it is retained in position by a shoulder that engages the hook K. This holds the mechanism in the desired position until the clutch pedal is pressed and the gear shifted. When the gear is shifted, however, the movement of the slide E brings a pin L against a trigger M, which releases the hook K and permits the rod G and the rest of the selector mechanism to snap back to neutral position.

When a gear is in mesh and none of the buttons is set for a gear change the clutch can be engaged and disengaged freely without affecting the gears. The finger P which is pressed by block O as E travels and pushes into neutral any gear that may be engaged, though leaving the finger selected in position for the gear shift. The contact of the slide E with the finger C does not take place until after the block O has pushed the neutralizer P the requisite distance to bring the gears to neutral. When this point has been reached the neutralizer P is forced out of contact with the block O.

The Lewis System

A mechanical type of gear shifter to be attached on the cover of the gearbox, has been brought out by the Lewis Mfg. Co., Philadelphia. By means of this gear shifter the actual sliding of the gears in the gearbox is accomplished by the clutch pedal as in the Vanderveld system, described herewith.

In operating the device, a small selector lever on the steering column is turned to the position to give the desired speed engagement, and when ready to shift the clutch pedal is thrust forward, this forward movement of the pedal not only dis-

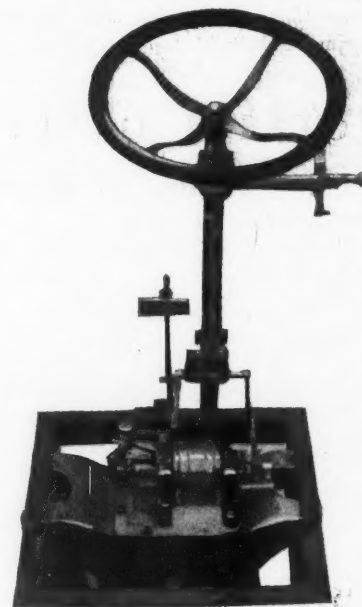


Fig. 3—The Lewis gearshifting device mounted on top of the gearcase. The illustration also shows the control under the steering wheel

engaging the clutch but accomplishing the movement of the gears, the sliding of the gear being timed to follow the disengagement of the clutch.

The Lewis shifter is purely a mechanical device and is carried on top of the gearbox cover or preferably on a cover plate especially made to take it, and which will fit any gearset. The Lewis consists of a series of square-section rods which are grouped around a central rod, H, as shown on the next page, and which operates them. The gearshifting arms are short and are fitted with cam-like surfaces with which steel rollers on the rods engage. The rod H has a projection at one end which does the actual gear engaging and by moving the lever under the steering wheel the projection is moved. The rod H is moved indirectly by the clutch pedal. Springs are used in this system only to affect return engagement of the shifter rods. The whole system operates in lubricant continually so there is little chance for wear of the working parts.

STEARNS CENTRALIZED CONTROL

Steering column control of the lighting system, ignition and carburetor is the feature of Stearns-Knight cars for 1914, the details of which have just been announced. The feature of the control system is compactness coupled with efficiency, for with the controls under the steering wheel, the minimum of effort is required by the driver to light the lamps, turn on the ignition switch or adjust the auxiliary air inlet of the carburetor.

The Stearns-Knight control system appears in the form of a box mounted under

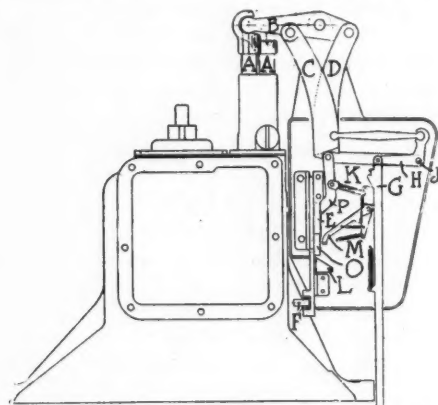


Fig. 1—Parts of the Vanderveld mechanical gearshift

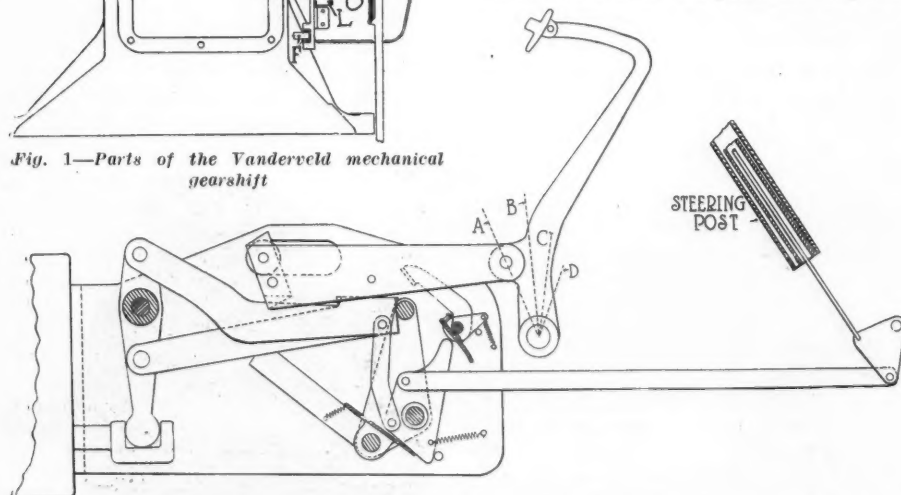


Fig. 2—The four clutch positions in the Vanderveld system. When at A the clutch is engaged, at B disengaged, at C the gears are in neutral, and at D the gears are in mesh.

the steering wheel, as shown in the illustration herewith, and from this box two small levers project. The upper one marked C is for carburetor adjustment purposes and the lower one, L controls the ignition system. Four small buttons also are incorporated in the box, these

being designed to control the head, side, tail and dashlights. The Klaxon horn control is on top of the steering wheel, where it is easily reached. All wiring has been simplified as far as possible and the outfit so inclosed as to make it proof against water and dirt.

Emerson Company in Starter Field

Electric Lighting Units Also Brought Out

THE Emerson Electric Mfg. Co., St.

Louis, Mo., has entered the motor car industry in a large way and announces variable output lighting generators and a line of cranking motors. The feature of the Emerson system of lighting is that it is adjustable by the operator for summer and winter use. In the cold days the lights are used for a longer period than in summer months when the days are comparatively long. The adjustable regulator feature has been adopted to save the battery, for it has been found that a summer charging rate is not suited for winter conditions. The battery may be charged at any current rate from 5 to 20 amperes, according to conditions.

By setting a simple direct-reading regulator the charging rate may be adjusted to meet requirements and as set forth by the Emerson these rates should be as follows: For those who do little night driving, 5 amperes and for the average summer work, 10 amperes; for spring and fall, 15 amperes and for winter 20 amperes. The winter rate takes into consideration the frequent and extended use of the cranking motor.

The Emerson lighting system consists of a generator, an automatic cutout and regulator, the latter shown in the illustration herewith as being mounted in a box on the generator casing. Two windows are provided through one of which the driver may see the rate at which the battery is being charged and through the other whether the generator is delivering current.

Emerson generators are of the shunt-wound, four-pole type and are designed to work in connection with 6-volt or 12-volt batteries. Annular ball bearings are used in construction. The generator which

may be fastened to the motor by straps or upon suitable castings, is designed to operate either in a clockwise or anti-clockwise direction as desired by the one installing the system. Performance curves of the lighting generator show that at 1,050 r. p. m. or approximately 16 miles per hour car speed the machine gives 20 amperes. The generators are made to operate at twice crankshaft speed and with the cutout either a part of the machine or a separate unit on the dash of the car.

The cranking motor offered by the Emerson company weighs but 29 pounds and at 6-volts develops 1.3 horsepower, it is claimed. Gear reductions of from 12 to 1 to 18 to 1 may be used and in special cases other ratios may be adopted. In external appearance the motor is similar to the generator shown herewith. Operation may be either clockwise or anti-clockwise and the support any desirable method suitable to the car's construction.

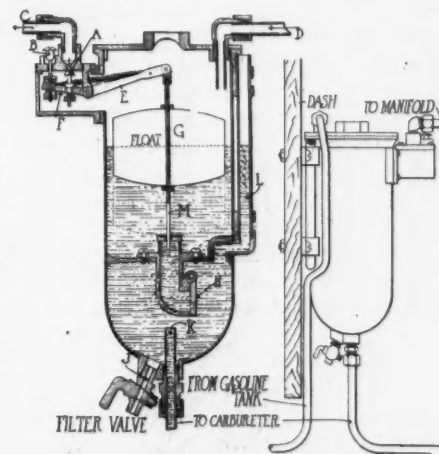
STEWART-WARNER VACUUM FEED

The Stewart-Warner Speedometer Corp. has brought out a device which permits of the conversion of the pressure fuel system using a tank in the rear of the chassis, to the straight gravity and uses no pump, air-tight tank or leads. The device is called the vacuum gravity feed from the fact the gasoline is drawn from the tank at the rear to the system by means of engine suction and is then fed to the carburetor by gravity. It consists of a small tank placed on the motor side of the dash one lead D in the illustration herewith running to the rear tank, another C to the intake manifold, and a third K to the carburetor. The small tank has two compartments, the upper one known as the filling chamber and the lower the reservoir. The upper one contains the float G which controls the valves A and B. The fuel in the upper chamber flows to the lower compartment through the valve H. Engine suction draws gasoline into the upper chamber and when the float has risen to

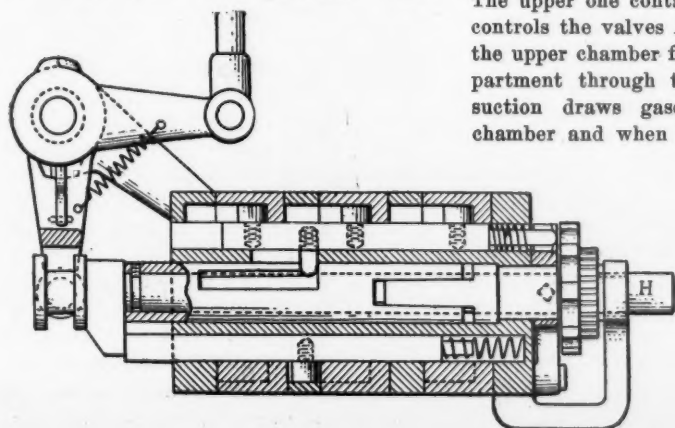


Stearns-Knight steering wheel showing the small box from which the lighting, ignition and carburetor are controlled

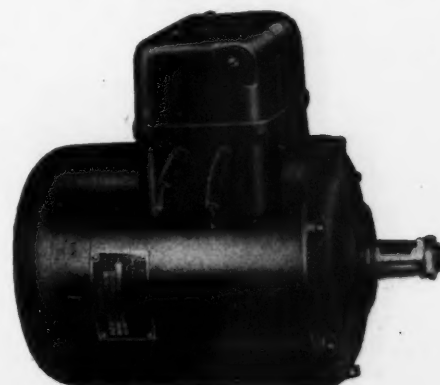
the top the suction is cut off and no more fuel flows. The fuel then drops to the lower chamber, where it is under atmospheric pressure and is fed to the carburetor. As soon as the float reaches its lowest position, the lever E is lowered so that it actuates the valve lever F, and this in turn closes the valve B against atmospheric pressure and again opens valve A, when the suction from the intake manifold again draws gasoline from the tank in the rear. The device makes it possible to place the tank in the rear of the car without adding an air-pressure system forms a convenient fuel strainer, water and dirt being drawn off by the filter valve J.



Stewart-Warner device which changes pressure to gravity feed



At the left is shown a sectional view of the Lewis mechanical gearshift mechanism, and at the right the Emerson lighting generator with regulator mounted on the casing



Accessory Offerings

Farnsworth Gas Generator

THE Distillate Motor Equipment Co., San Francisco, announces the Farnsworth Gas generator, a device which preheats the fuel mixture and makes it possible, it is claimed, to operate a motor car engine with distillate, kerosene and other low-grade fuels. Exhaust gas is used for heating the mixture. The Farnsworth generator is attached to the carburetor as shown at G in Fig. 1, and the exhaust gas taken from the exhaust pipe is passed around the chamber in the device. The generator itself is a cylindrical-shaped container, as shown in the illustration. Prof. Sibley, of the University of California, made several tests of this generator on a Velie car and the results, as stated by him, show that a great saving is possible, due both to the small amount and the low quality of fuel used. When operated on gasoline, for example, the brake horsepower developed by the motor was 11.76 at 235 r. p. m., and without the generator, 11.29 at 225 r. p. m.

In the first test which was made without the generator, the fuel consumed was 1.51 gallons, while with the apparatus installed, this was reduced to 1.48 gallons. A distillate test was made and the fuel consumption lowered to 1.40 gallons, and at the same time, a horsepower rise of .54 over the first test. It was shown that the Velie car upon which the test was made would travel 12.6 miles per gallon on gasoline without the Farnsworth installed, 15.3 with the apparatus in place, and 16.8 miles per gallon operating on distillate.

Kerosene showed an average mileage per gallon of 15.3, slightly less than distillate. It was further demonstrated that the use of the Farnsworth materially decreases the depositing of carbon, and in the tests made practically none deposited on either intake

or exhaust valves. No trouble was encountered during the tests except for a slipping clutch which developed during the run on kerosene.

R. O. C. Superheater

Another form of fuel superheater which uses exhaust gas, is announced by the National Economic Supply Co., New York. This heater is attached in the fuel line and heats the gasoline before it enters the carburetor. The heater consists of two chambers, one for exhaust gas and the other for the fuel, the latter surrounding the former, and in this way the heated fuel is taken into the carburetor and vaporization affected more readily. The installation of the R. O. C. is simple. The fuel line is tapped and the two ends at-

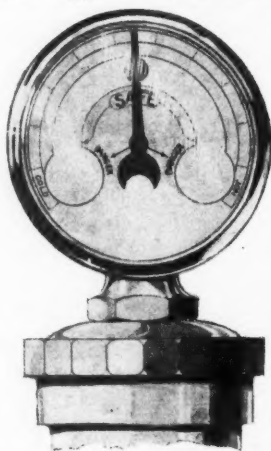


FIG. 2—STANDARD AUTO-THERMO

Screwed into the radiator cap it tells the condition of the motor by registering the temperature of the water

tached to the superheater and likewise the exhaust pipe or manifold is tapped and a lead taken to the device. The outlet for the exhaust gas after it has given up some of its heat to the fuel is by any convenient means preferably through a pipe extending through the mud pan. In Fig. 5 is shown the position of the superheater S and the various connections necessary. It sells for \$5.

Fowler Motor Thermometer

An instrument which indicates the temperature of the coolest water in the circulating system of a car is being marketed by the Fowler Motor Thermometer Co., St. Louis, Mo. This instrument, known as the Fowler Motor Thermometer, is placed on the dash where it may be read at all times. The mechanism is contained in a pocket which is connected by two pipes which tap the water system, as shown in Fig. 3. Thus the water from the cooling system is made to pass around the mechanism. The Fowler depends for its action upon the expansion and contraction of metals. When the metal becomes hot it expands,

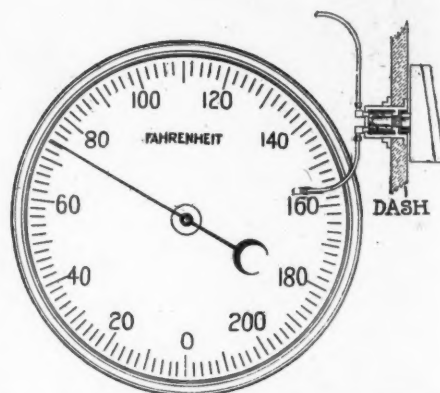


FIG. 3—FOWLER MOTOR THERMOMETER

A dash instrument for indicating the temperature of the coolest water in the system

and by proper connection to a dial the later is made to register degrees of rise in temperature according to the expansion of the metal. The indicating face of the instrument is calibrated in fahrenheit degrees just as an ordinary thermometer and all the driver need do to determine the condition of the water in the system is to glance at the face. The price of the Fowler is \$10, and it may be installed in a short time by the average mechanic.

Standard Auto-Thermo

Another radiator indicator, but one which is placed on the radiator cap, is being marketed by the Standard Ther-



Fig. 4—Gaulois non-skid tire, a foreign make marketed in this country

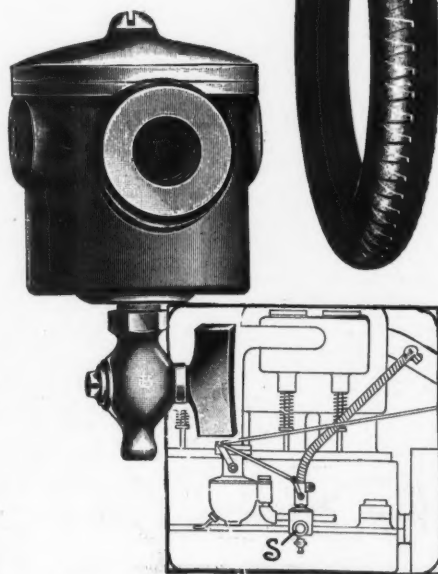


FIG. 5—R. O. C. SUPERHEATER

Which uses exhaust gas to preheat the fuel, thus giving better carburetion

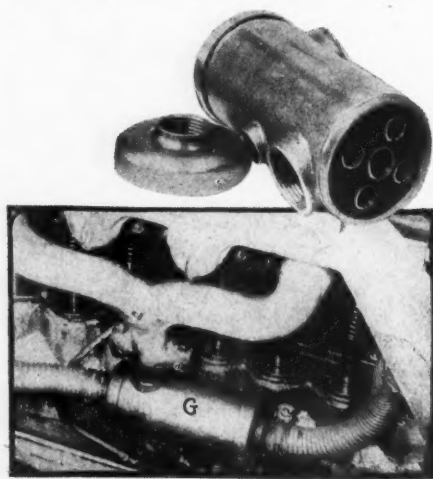


FIG. 1—FARNSWORTH GENERATOR

This device heats the carburetor mixture and makes it possible to operate a motor car engine on kerosene or distillate, it is claimed

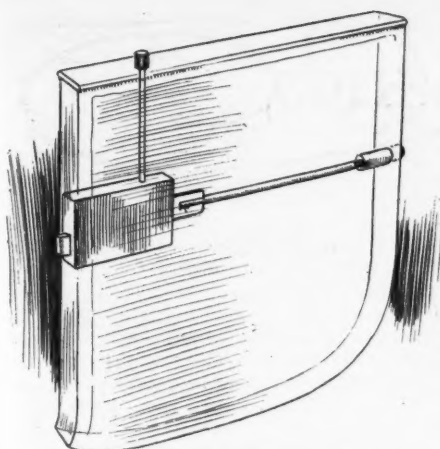


FIG. 6—AUTOMATIC DOOR LOCK

The only visible portion of this mechanism is the small button on the moulding

mometer Co., Roxbury, Mass. This device, known as the Auto-Thermo, is a mechanical instrument and indicates the water temperature by a hand as in the Fowler, described on the previous page. The hand, as shown in Fig. 2, may indicate safe or danger and intermediate points on the scale. The Auto-Thermo is installed easily, all that is required being the drilling of a hole in the radiator cap. This device sells for \$5.

Gaulois Non-Skid Tire

The French tire known as the Gaulois, made by the Bergougnan company abroad and marketed in America by the Gaulois Tire Corp., New York, is offered in a number of rough and plain treads. The non-skid Gaulois, shown in Fig. 4, is claimed to be exceptionally resilient, have wearing qualities above the average, and afford good traction. The 34 by 4-inch non-skid, sells for \$41.30.

Pasco Sidelights

The Portland Auto Specialty Co., Portland, Me., announces the Pasco electric sidelights which may be attached to any make of car and are said to throw suf-

ficient light to make the use of the headlights unnecessary. The bulb is placed vertically, as shown in the illustration in Fig. 9. The lamps may be operated by a 6-volt storage battery, the bulbs being of the 6-volt 4-candlepower type. The outfit consisting of two sidelights, brackets, bulbs and dash switch, sells for \$6.

Burd Piston Ring

The Cotta Transmission Co., Rockford, Ill., is manufacturing the Burd piston ring, which is constructed somewhat differently than some rings which prevent oil and gas from leaking past the piston. The Burd ring is in two parts, as shown in Fig. 10, the portion C being known as the coupler and is placed on the piston after the other part R is in place. The coupler is held in position when the piston is in the cylinder. The Burd ring is of the same thickness all around and is said to prevent gas and oil



FIG. 9—PASCO NOVEL SIDELIGHT

May be attached to any make of car and may be used instead of the headlights

leakage into the crankcase chamber. No special training is necessary to either remove or replace Burd rings, and the chance of ring breakage when spreading over the piston head is reduced somewhat because of the flexibility of the metal.

No-More-Rust Rim Paint

The Atlas Auto Supply Co., Chicago, is marketing a paint for rims which is claimed to make tire removal easy and prevent the rims from becoming rusted. The paint is called No-More-Rust, is applied with a brush and is a protection to both the tire and the rim. A ½-pint can sells for 50 cents.

Automatic Door Lock

A concealed latch for motor car doors which has unique features is that illustrated in Fig. 6. The entire mechanism is concealed within the panels of the door, the only visible portion being a small button on the top. When this button is pressed the door may be opened, but not otherwise, and it is so arranged that it

locks automatically as the door is closed. The latch is held by a fairly stiff spring, which is released to open the door by the pressure of the button through the vertical rod and is reset by the pressure of the rear door jamb against the end of the horizontal rod as the door is closed. For inclosed bodies this is arranged to be operated electrically by the driver or passengers. It is made by the Automatic Lock Co., Chicago.

Goodrich Safety Retread

In Fig. 11 is shown the Goodrich retread which may be placed over a casing with a worn tread and gives it the appearance and usefulness of a new tire. This retread is held in place securely by air pressure.

Chamberlain Plier Wrench

A tool which consists of an adjustable wrench, a wire cutter, pliers and screwdriver, is announced by the Chamberlain Wrench Co., Geneva, Ill. The Chamberlain, shown in Fig. 7, is a drop-forging, case-hardened and sells for \$2.25.

Turbine Muffler

The Turbine Muffler Co., Chicago, is manufacturing a device which takes the place of the muffler and is claimed to pull the exhaust gas out of the line and expel it much faster than ordinarily, thus giving increased power.

This muffler consists of two chambers, as shown in Fig. 8, the one at the left being called the expansion chamber and that at the right containing the wheel which draws the exhaust gas from the pipe. A by-pass runs from the wheel hub to a point on the pipe E which is connected to the exhaust pipe. The rotation of the wheel causes the gases to be drawn to the wheel center through the by-pass after each successive power stroke and the expansion chamber next receives the gases. The small deflector F starts the gas in a whirling motion and sends it out through the opening provided.



Fig. 7—Chamberlain Plier Wrench which incorporates a screwdriver, wire cutter, pliers and adjustable wrench

Fig. 8—Turbine muffler which is designed to draw the gases out of the exhaust pipe

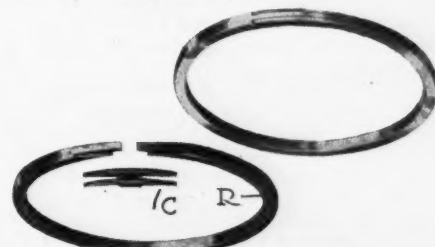
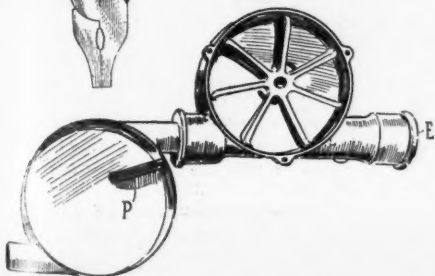


FIG. 10—BURD PISTON RING

This ring is of simple construction and is made in two parts, the ring proper R and the coupler C

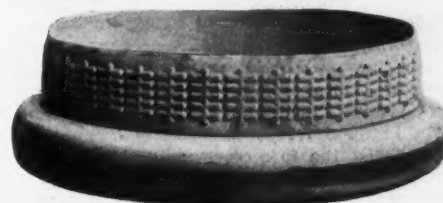


FIG. 11—GOODRICH SAFETY RETREAD

Designed to be placed over a casing with a worn tread as shown, and almost doubles tire life



From the Four Winds



PASS 25,000 Registration Mark—Wisconsin motor car registrations by private owners passed the 25,000 mark on March 27. At the close of business the total 1914 registration was 25,401. More than 1,000 licenses have been issued to dealers. The 1913 registration totaled 34,646.

Want Brick on National Road—Good roads enthusiasts as well as brick manufacturers of Zanesville, O., have made a united protest against the plans and specifications of improving the old National highway through Muskingum county with concrete instead of brick as originally planned. The advocates of brick paving threaten to appeal the case to President Wilson.

Builds Rear-Steer Cyclecar—Chalis Robinson, a Los Angeles high school student, has completed a cyclecar embodying several unique ideas and principles not found in the larger machines. The machine steers with the back wheels, while the power is transmitted to the one front wheel by a direct drive. It has a speed of 35 miles an hour.

Spent Almost \$2,000,000 on Roads—Montana counties spent on bridges, roads and highways last year the sum of \$1,786,041.51, according to the report of the Montana highway commission. This is an increase of \$200,000 over the 1912 expenditures. The counties had on hand at the beginning of this year about \$1,400,000 to start operations for 1914.

Log West Texas Airline—The Pecos Valley Automobile Association has completed the logging of the West Texas airline from Van Horn to Edwards' Bros. ranch in Crane county. The road joins the new highway being built by the Midland County Automobile Association. An effort is being made to get Ward and Ector counties to issue bonds to build the road through the sand strip in those counties.

Plan for Ohio Market Roads—The detailed plans for completing the system of main and market highways in Franklin county and turning them over to the Ohio highway commission for future maintenance have been worked out by State Highway Commissioner Marker and the county commissioners. The roads comprise ten of the market roads of the state and have a mileage of about 100 miles. It is planned to have every one improved by January 1, when they will be turned over to the state highway department.

Ban on Dazzling Headlights—Hartford, Conn., now has an anti-brilliant headlight ordinance which was passed after a long fight. There have been complaints of late of dazzling headlights in consequence of which the chief of police has promised rigid enforcement. The fire and police department vehicles are exempt from the ordinance while on the way to a fire or scene of trouble. Trolley cars also come under the ban. A fine of \$5 is imposed for the first offense.

Plan Forest Reserve Roads—The construction of a 15-mile road in New Mexico from Reserve to Alma, to connect the Datil and Gila national forest reserves, is being considered by the forest service and the state. District Forester A. C. Ringland and Forest Supervisor Don P. Johnson recently conferred with Governor McDonald regarding such a road, which would give Silver City and the Mogollon country direct connection with the ocean-to-ocean highway. The motor road from Silver City already

extends to Alma and the ocean-to-ocean highway to Springerville, Ariz., from Socorro and Magdalena touches Alma, leaving a gap of only 15 miles necessary to give Silver City direct connection. The cost of the road would be heavy, being through a rough and mountainous region.

New Bridge to Benefit Motorists—The new bridge across the Rio Grande near Socorro, N. M., will soon be opened for traffic, shortening the distance between Socorro and Albuquerque to 80 miles and affording a route which can be made in 4 hours by motor car.

Denver Dealers in Fashion Show—About thirty-five dealers in motor cars and accessories are maintaining special displays in their salesrooms this week in connection with Denver's first fashion show, conducted by the downtown merchants. The event opened with an evening parade of decorated and illuminated motor cars through the principal business streets. This feature is counted upon to be of considerable bene-

fit to the motor car trade, and the dealers are going into the program with extra enthusiasm because of the recent decision not to have any regular show in Denver this season.

Pays \$165 for Car Thieves' Arrest—The Automobile Club of St. Louis has paid since February 18 \$160 in rewards for the arrest of persons convicted of stealing or driving away with motor cars that did not belong to them or without the consent of the owners. Most of the claims for rewards were for the arrest of persons who drove away with machines without consent of the owner. The reward offered by the club for this offense is \$25. After April 1 the club will pay rewards only for the return and arrest of persons stealing cars belonging to club members.

Iowa State A. A. Elects Officers—The Iowa State Automobile Association held its annual meeting in Des Moines during the motor show there and re-elected G. Decker French, of Davenport, president. Hal R. Wells, of Des Moines, Iowa's most famous driver, was chosen vice-president. He holds the Chicago-Des Moines and the trans-Iowa records. A. E. Nissen of Iowa City was elected secretary and treasurer. Other vice-presidents are: C. M. Beem, of Charles City; C. M. Wyckoff, of Sioux City; and W. F. Coan, of Clinton, who also is Iowa consul for the Lincoln highway.

Strict Enforcement of Traffic Rules—Enforcement of traffic laws in Minneapolis will be tightened up at once. Laxity in observance of some of the commonest rules will result in absolute observance of the following: Heavy and slow moving vehicles must keep at curb; vehicles must not stand at curb more than 20 minutes; excessive speed must be avoided; mufflers must be closed and signals must be sounded only when necessary; street cars must not be passed when taking on passengers; corners must be turned according to traffic regulations.

Lima Motorists in Protest—The Lima Automobile Club, of Lima, O., has made violent protest against the action of the commissioners of Allen county to refusing to accept state aid for road improvement during the coming summer. Allen county is one of the few counties in the Buckeye state which refused state aid. The refusal was made on the ground that the commissioners did not want to appropriate \$40,000 in order to get the \$40,000 from the state. The county has a credit of \$30,000 from the state which it refused to accept last year. Motorists are bringing strong pressure to bear upon the commissioners to have their action rescinded.

Hoosiers Petition for Concrete Roads—Petitions have been filed with the Marion county commissioners, Indianapolis, asking that 30 miles of roads in Washington township be paved with concrete. A hearing on the petitions will be held April 20. The roads it is proposed to improve connect with the Maple Road boulevard in Indianapolis or with other gravel roads and would form a complete system of roads. It is estimated the cost of making the improvement would be \$300,000, and to raise this it is proposed to sell bonds, part maturing in 10 years and part in 20 years. The petitions ask that the pavements be 16 feet wide with a 7½-inch depth of concrete in the center and a 5½-inch depth at the sides.

Coming Motor Events

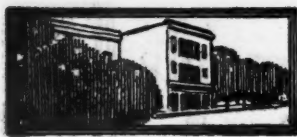
SHOWS, CONVENTIONS, ETC.

- April 12—Show, Palermo, Sicily.
- April 12-19—Austrian show.
- April 14-18—Deadwood, S. D., show.
- September 26-October 6—Berlin show.
- June 23-26—S. A. E. summer meeting, Cape May, N. J.
- October 16-26—Paris show.
- November 6—Olympia show.

CONTESTS

- April 19-29—Coupe de Tourisme, 1,000-mile cyclecar and light car endurance test around France.
- April 22—Track meet, Bakersfield, Cal.
- May 25-26—Targa Florio race, Sicily.
- *May 30—Indianapolis 500-mile race.
- May 30—New York track meet.
- May 30—Track meet, Providence, R. I.
- June 1—Florio cup race, Island of Sicily.
- June 6-7—Track meet, St. Louis, Mo.
- June 10-11—Isle of Man road races, Great Britain.
- *June 18—Hill climb, Uniontown, Pa.
- June 30—Track meet, Sioux City, Ia.
- July 3-4—Road races, Tacoma, Wash.
- July 4—French grand prix, Lyons.
- *July 4—Three hundred mile race, Sioux City, Ia., speedway.
- July 4—Track meet, Providence, R. I.
- July 17-18—Speedway races, Seattle, Wash.
- July 25-26—Belgium grand prix road races.
- August 15—Le Mans cyclecar grand prix race.
- July and August—French army truck subsidiary trials.
- August 2-9—Six day cyclecar reliability in French Alps.
- August 16—Coupe Internationale; light car race, Le Mans.
- August 17—Grand Prix of France, Le Mans.
- August 21-22—Road races, Elgin, Ill.
- September 5—Track meet, Milwaukee, Wis.
- September 6-7—Italian grand prix.
- September 7—Track meet, Providence, R. I.
- September 9—Speedway races, Pomona, Cal.
- September 9—Road race, Corona Beach, Cal.
- September 14—Track meet, Milwaukee, Wis.
- October—Kerosene motor tests, Paris.
- October—Gallion hill climb, Paris.
- October 2-3—Track meet, Oklahoma City, Okla.
- October 2-3—Track meet, Trenton, N. J.
- November 8-11—Track meet, Shreveport, La.
- November—El Paso-Phoenix road race.

* Sanctioned by A. A. A.



Among the Makers and Dealers



PEERLESS Declares Quarterly Dividend—The Peerless Motor Car Co., Cleveland, has declared the regular quarterly dividend of 1½ per cent on the preferred stock, payable April 1.

Joins Mitchell-Lewis Company—H. R. Brown has resigned as western division sales manager of the Thomas B. Jeffery Co., Kenosha, to identify himself with the Mitchell-Lewis Motor Co., Racine, Wis.

Test Trips for Lozier Four—An innovation with the Lozier Motor Co. is a weekly test trip for the Lozier four. Once a week a new car, right out of production and without any attention or tuning up, is sent out on the road.

Making New Cyclecar Motor—The Clark Engine and Boiler Co. of Kalamazoo, Mich., is building a 10-12 horsepower, four-cylinder water-cooled motor for cyclecars which will be put on the market about July 1.

Order 19 Carloads of Overlands—During the first 14 days in March a total of nineteen carloads of Overland cars were ordered by the agents of J. W. Leavitt Co. in various parts of western Washington and British Columbia. The business this season is far ahead of last year, according to Tom White, the Seattle manager for this company.

New Factory for Parts Maker—The Peters Machine and Mfg. Co., maker of transmissions, front and rear axles and steering gears, will erect a large factory at 7320 Madison avenue, Cleveland, O. The building will be 80 by 209 feet. It will be a one-story structure of brick and steel, but the foundation will be so constructed that a second story can be added.

New Stewart-Warner Managers—Frank M. White, formerly manager of the Stewart-Warner Speedometer Corp.'s New York branch, who for the last 2 years has been at the factory in Chicago, has again taken up his duties as manager of the New York branch. F. O. Fleischner, who has been New York manager, remains as office manager. J. J. Hildebrecht, who has been manager of the Pittsburgh branch, has taken up his new duties as a special salesman. The new Pittsburgh manager is A. T. Henderson.

Start Production of Crescent Car—Within a week after the company was organized the Crescent Automobile Co., of St. Louis, opened its factory. The plant is located at Main and St. George streets in a leased building. The company will sell cars that will retail for between \$900 and \$1,000. The company's product will be an assembled machine, the parts being bought outside and the bodies made in St. Louis. The first car will be out of the shop, it is said, by April 15. The line is to consist of a roadster and a five-passenger touring car and will be known as the Crescent.

Ford Plans for Cleveland Branch—The location of a large assembling plant for the Ford Motor Co. at Euclid avenue and East One Hundred and Seventeenth street, Cleveland, O., is said to be contingent upon the granting of a permit by the city to run an overhead spur of the Belt Line railroad across East One Hundred and Seventeenth street to accommodate the plant. Negotiations for a location for an assembling plant in Cleveland began several months ago and it was stated the branch would be one of the largest and most important of the company's chain. Cleveland is the distributing

point of a large territory and about 4,500 Ford cars were sold from the company's branch, 4400 Euclid avenue, last year. The allotment of cars for the present year is said to be 7,000.

To Manufacture Truck Governors—Benjamin G. Kramer, president of the B. G. Kramer Co., 243 Lake street, Milwaukee, manufacturing machinery specialties, has organized the Kramer Governor Co., capital \$25,000, to manufacture governors for motor trucks. John H. Hurley and Max Gessler are associated with Mr. Kramer in the new venture. Headquarters will be established at once in the present Kramer works on Lake street.

Making Small Four-Cylinder Motor—The Herrmann Engineering Co., Detroit, announces that it is in a position to manufacture small four-cylinder motors suitable for light cars or cyclecars in large quantities. The engine is block-cast and 2½ by 4 inch size, being watercooled. It is stated that the weight can be reduced to 155 pounds. The normal weight is 170 pounds, the difference being due to the quantity of iron or aluminum optionally used. The construction of the motor is along conventional

lines, the crankshaft being a single piece drop-forging, and the other moving parts being of suitable materials. The cylinder head is removable, as is also the lower half of the crankcase.

Oakland General Auditor Resigns—F. A. Tooley, who has been general auditor of the Oakland Motor Car Co. for the past 2½ years, has resigned. Prior to his connection with the General Motors Co. he was with the Mitchell-Lewis Motor Co., of Racine, Wis.

Will Make Kerosene Vaporizer—The Affiliated Manufacturers Co., Milwaukee, designing engineer and contractor, owning and controlling the manufacture and sale of several patented articles, has decided to make a feature of a kerosene vaporizer designed by E. P. Gould, chief engineer of the company. It is claimed the appliance makes any ordinary gasoline engine a high efficiency kerosene engine without alteration and at a fuel saving of approximately 66½ per cent over gasoline. The appliance will be manufactured in large quantities under contracts with local manufacturers and the Affiliated concern will handle the sales.

Recent Incorporations

Albany, N. Y.—Mason Brothers, capital stock, \$10,000; incorporators, E. H. Ellenwood, C. H. Mason, S. H. Mason.

Albany, N. Y.—G & Z Garage Co., capital stock, \$50,000; incorporators, L. E. Swartz, B. Gorschalki, S. S. Zula.

Boston, Mass.—Cooper Mfg. Co., capital stock, \$10,000; incorporators, J. J. Cooper, K. M. Cooper, C. E. Tupper.

Boston, Mass.—Kilgore Motor Starter Co., capital stock, \$15,000; incorporators, C. D. McCarthy, A. J. Daly, F. O. Kilgore.

Bridgeport, Conn.—Arthur McMullen, Jr., Automobile Co., capital stock, \$5,000; to deal in motor cars; incorporators, A. McMullen, Jr., A. McMullen, J. McMullen.

Brooklyn, N. Y.—British Automobile Co., capital stock, \$1,000; incorporators, R. Humphrey, L. E. Feather, T. Feather.

Buffalo, N. Y.—Wilson's Ford Special Corp., capital stock, \$15,000; to sell motor cars; incorporators, K. R. Wilson, G. F. Schultz, A. C. McCall.

Buffalo, N. Y.—George Schmitz & Brother, capital stock, \$5,000; to manufacture motor car bodies; incorporators, O. Schmitz, J. G. Schmitz, G. Schmitz.

Buffalo, N. Y.—Motor Radiator Corp., capital stock, \$50,000; incorporators, C. W. Dippert, E. W. Werick, W. M. Causley.

Chicago—Firestone Tire & Rubber Co., capital stock, \$50,000.

Chicago—American Electric Car Co., capital stock, \$1,056,400; to manufacture motor cars and accessories.

Cleveland, O.—Hartman Auto Transfer Co., capital stock, \$10,000; general transfer business; incorporators, J. A. Nally, R. P. Snyder, K. Kneale, E. G. Nally, R. V. Nally.

Cleveland, O.—Cleveland Auto Fender Co., capital stock, \$20,000; to manufacture and deal in parts; incorporators, J. S. Dickie, F. C. Carpenter, W. Schoellkopf, F. H. Smith, F. E. Dellenbaugh.

Cleveland, O.—Buckeye Suspension Co., capital stock, \$100,000; to manufacture shock absorbers; incorporators, W. L. David, W. T. Kinder, R. Rurroughs, T. H. Jones, G. Abbott.

Dover, Del.—Delaware Tire & Supply Co., capital stock, \$25,000; to manufacture tires and motor car supplies; incorporators, N. B. Mancill, J. C. Bishop, F. L. Garrett.

Dover, Del.—Napa Tire & Rubber Co., capital stock, \$100,000; to deal in tires; incorporators, M. B. Hirschbein, A. Hirschbein, W. I. Lofland.

Dover, Del.—American Auto-Tractor Co., capital stock, \$300,000; to manufacture engines; incorporators, E. C. Reed, C. C. T. McCaffry, C. G. Guyer.

Dayton, O.—Bradley Electric Garage Co., capital stock, \$10,000; to deal in motor cars; incorporators, F. Bradley, F. Blessing, L. E. Bradley, A. E. Miller, T. M. Heister.

Elyria, O.—Hadaway Taxicab Co., capital stock, \$2,000; taxicab business; incorporators, G. H. Hadaway, B. Hadaway, L. Hadaway, N. Hadaway, A. Nieding.

Galion, O.—Gallon Dynamic Motor Truck Co., capital stock, \$250,000; to manufacture and deal in motor trucks; incorporators, J. B. Holmes, G. W. Nickels, N. G. Knight, C. H. Schaefer, J. J. Bittner.

Glens Falls, N. Y.—Empire Gasoline Co., capital stock, \$5,000; incorporators, D. H. Cowles, F. M. Starbuck, D. McK. Hepburn.

Laredo, Tex.—Laredo Auto Sales Co., capital stock, \$12,500; incorporators, J. R. Moore, W. J. Sames, J. P. Applewhite.

Lawrence, Mass.—Boulevard Garage Co., capital stock, \$5,000; incorporators, M. J. Doyle, J. P. Brennan, M. H. Doyle.

McKeesport, Pa.—Jiffy Specialty Co., capital stock, \$25,000; to manufacture and deal in motor cars and accessories.

New York—Holden One Man Top Co., capital stock, \$25,000; to manufacture tops; incorporators, N. Holden, S. Nehtzoff, O. K. Pacht.

New York—Advance Tire Sales Co., capital stock, \$5,000; incorporators, G. A. Burnette, G. L. Lewis, C. H. Stanton.

New York—Euclid Motor Car Co., capital stock, \$250,000; incorporators, E. F. Kalkhof, M. K. Cowie, H. M. Flowman.

New York—Yellow Taxicab Co., capital stock, \$500; incorporators, H. J. Osborne, J. C. Taylor, T. G. O'Brien.

Oklahoma City, Okla.—Skiatook Garage Co., capital stock, \$3,000; incorporators, W. J. Shafer, C. L. Wall, L. E. Mason.

Oklahoma City, Okla.—Bulck Motor Co., capital stock, \$12,500; incorporators, R. H. Collins, W. H. Vesper, L. P. Ohland, H. C. Page.

Philadelphia, Pa.—Atlantic States Sales Co., capital stock, \$25,000; to manufacture and deal in motor cars; incorporators, F. R. Hansell, George Martin, S. C. Seymour.

Philadelphia, Pa.—Consumers Tire & Sale Co., capital stock, \$500,000; to manufacture accessories; incorporators, F. R. Hansell, George Martin, S. C. Seymour.

Portland, Me.—Raymond Auto Wheel Co., capital stock, \$500,000; to manufacture and deal in motor cars, wheels, etc.; incorporators, H. E. Eaton, B. G. Ward.

Riverton, N. J.—Broad Street Garage & Sales Co., capital stock, \$25,000; general motor car business; incorporators, C. F. Nuth, G. N. Wimer, S. A. Wimer.

Rochester, N. Y.—Alderman Mfg. Co., capital stock, \$5,000; to manufacture and deal in accessories; incorporators, A. W. Alderman, C. L. Pierce, W. E. Hazard.

St. Louis, Mo.—Fowler Motor Thermometer Co., to manufacture thermometers; incorporators, F. E. Fowler, Sr., and F. E. Fowler, Jr.

Trenton, N. J.—Motor Tire Reconstruction Co., capital stock, \$250,000; to manufacture tires; incorporators, C. N. King, G. H. Russell, W. L. Steck.

Waterbury, Conn.—Waterbury Tire Co., capital stock, \$2,500; incorporators, G. J. Richard, H. Power, F. Hayes, E. L. Seery.

Youngstown, O.—Car-Nation Auto Sales Co., capital stock, \$10,000; to market cars; incorporators, I. Wilkoff, S. O. Shulman, A. Kessler, M. H. Squires, L. J. Shulmas.



Brief Business Announcements



WARREN, O.—W. H. Marsh has opened the Park garage at Warren, O. He is agent for Buick cars.

Columbus, O.—The Duffy Mfg. Co., 19 East State street, has been made central Ohio distributor for the Pyrene fire extinguisher.

Jersey City, N. J.—Arthur Waterman has been appointed vice-president and general manager of the Hartford Suspension Co., Jersey City, N. J.

Grand Rapids, Wis.—Edward Kampe, of Grand Rapids, Wis., has leased the Metzger building, Baker street, and is equipping a garage and repair shop.

Lancaster, O.—Harry Davis, president of the Midgley Tire and Rubber Co., has closed a deal for the purchase of the plant of the Flint Glass Co. at Lancaster, O., which will be used for a tire factory as soon as it is remodeled and machinery installed.

Chicago—The Stewart-Warner Speedometer Corp. announces the following new service stations: Winnipeg, Man., Schmidt Co.; El Paso, Tex., El Paso Speedometer Service Station Co.; Scranton, Pa., Scranton Speedometer Service Station Co.

Cuyahoga Falls, N. Y.—The stockholders of the Falls Tire and Rubber Co., of Cuyahoga Falls, O., have authorized an increase in the capital stock from \$200,000 to \$300,000 in order to provide additional working capital to take care of the rapidly increasing business. The company has decided to

maintain a factory branch in Cleveland, succeeding the J. F. Allen Co. at 2001 Euclid avenue.

Columbus, O.—The I. J. Cooper Rubber Co., 263 North Fourth street, has taken the central Ohio agency for the Motz cushion tires.

Cleveland, O.—P. R. Walker, formerly factory representative of the Sanford Motor Truck Co. at Syracuse, N. Y., has established a sales branch at the Auto Shop, Vincent street, Cleveland.

Cleveland, O.—A. C. Fletcher has purchased the general garage and repair business of the Foster & Birdsall Co., 1851 East Sixty-fifth street, Cleveland.

Unity, Wis.—M. S. Matteson, of Unity, Wis., has purchased a site and will build a fireproof garage 40 by 75 feet in size. No agency lines have been selected as yet.

Cleveland, O.—Edward B. Busby, for the past 4 years sales manager of the Anderson Forge and Machinery Co., Detroit, has been appointed general sales manager for the Ferro Machine and Foundry Co., Cleveland, Ohio.

Baraboo, Wis.—Philbrick & Mather, garage and sales agency, Baraboo, Wis., has been dissolved, Orriel Philbrick retiring. The business will be continued by Clinton F. Mather, who retains the agencies for the Overland and Maxwell. The garage is

known as the Gem City Automobile Co. Mr. Mather has added the International truck.

Indianapolis, Ind.—O. C. Revel, who has been manager of the Indianapolis sales branch of the Diamond Tire Co., has been promoted to assistant district manager at Chicago. He has been succeeded at Indianapolis by H. D. Bentley, who has been with the company at Chicago.

Milwaukee, Wis.—Abraham Fredman has retired from the two firms of Fredman's garage and A. Fredman's Sons, 2444-2446 Lisbon avenue, Milwaukee, Wis., and the businesses will be continued under the same styles by the sons, Max and Samuel Fredman.

Tarrytown, N. Y.—The Motokart Co., which recently absorbed the Tarrytown Motor Car Co., Inc., and the Steinbock Engineering Co., Inc., announces as its officers: President, A. R. Cormully; vice-president, H. E. Steinbock; second vice-president, C. C. Wolfe; treasurer, B. J. Knerr; secretary, E. M. More; purchasing agent, F. C. Sievers.

Oklahoma City, Okla.—Smith Bros. Palace garage has been sold to H. F. Hayers. With the consummation of the sale the consolidation of four garages is effected. Smith brothers, who recently operated the Broadway and the Palace garages separately, consolidated the two at the Palace in January. A few weeks later the business of the Oklahoma Motor Car Co. was trans-

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Ames, Ia.	M. A. Miller	Maxwell	Corpus Christi, Tex.	W. A. Wakefield	Pilot
American Fork, Utah	W. A. Devey	Maxwell	Coraopolis, Pa.	A. R. McCutcheon	Oakland
Allentown, Pa.	Krause Auto Co.	Maxwell	Conemaugh, Pa.	S. S. Mack	Oakland
Alfred, N. D.	Klundt Co.	Maxwell	Cleveland, O.	Crotty Co.	Havers
Albany, N. Y.	C. S. Ransom	Maxwell	Cleveland, O.	Crotty Co.	Regal
Arcanum, O.	Arcanum Garage	Hupmobile	Durham, N. C.	Durham Motor Sales Co.	Maxwell
Arcanum, O.	Arcanum Garage	Chalmers	Dalton, Minn.	Dalton Trade Co.	Maxwell
Allerton, Ia.	Allerton Telephone Co.	Oakland	Dubuque, Ia.	Kassler Auto Co.	Maxwell
Arlington, Neb.	Fred Menking	Auburn	Douglas, Ariz.	W. W. Holmes	Hupmobile
Athens, Ga.	C. B. Griffith	Maxwell	Denver, Colo.	Elmore Auto Co.	Pilot
Alton, Ill.	O. Rousseau	Metz	Dixon Spring, Tenn.	Gregory & Morton	Maxwell
Ashland, Neb.	M. W. Urch	Studebaker	Dassel, Minn.	Dassel Motor Co.	Maxwell
Audubon, Iowa	A. E. Beason	Jeffery	Edgeley, N. D.	W. Pepper & A. H. Canow	Maxwell
Avoca, Iowa	Derby Auto Co.	Studebaker	Ellston, Ia.	E. B. Fouser	Maxwell
Alpine, Tex.	Gas Edwards	Hupmobile	Elk Point, S. D.	Main & Fixey	Hupmobile
Akron, Ohio	Gangl & France	Pilot	Easton, Pa.	M. H. King	Pilot
Aberdeen, S. D.	Payne Auto Co.	Maxwell	Farmington, Mo.	Walter L. Morris	Oakland
Binghamton, N. Y.	F. M. Cossitt	Pilot	Pitchburg, Mass.	N. E. Goodwin	Imp
Belleflower, Mo.	E. S. Mentze	Wahl	Premont, O.	East Side Implement Co.	Studebaker
Blackfoot, Ida.	J. H. Ashton	Maxwell	Fulton, Ky.	Johnson & Holloway	Oakland
Bruceton Mills, W. Va.	George W. Bice	Maxwell	Grand Junction, Colo.	E. A. Ryan	Imp
Brandon, Tex.	D. J. R. Youngblood	Maxwell	Glasgow, Mont.	Sidney J. Rundel	Maxwell
Bamberg, S. C.	G. D. Ryan	Maxwell	Grand Island, Neb.	Mat Jarvis Auto Co.	Oakland
Benkelman, Neb.	E. A. Mathews	Oakland	Genoa, Neb.	Munson & Son	Oakland
Baltimore, Md.	Empire Sales & Repair Co.	Empire	Glendale, Cal.	R. H. Clark	Hupmobile
Boston, Mass.	George Canterbury	Simplex	Glassport, Pa.	Cyril C. Schwerba	Pilot
Berkely, Cal.	James & Hunt Motor Car & Supply Co.	Imp	Hackensack, N. J.	T. Blackmore	Imp
Brownsville, Tex.	J. D. Curtiss	Hupmobile	Hannibal, Mo.	Hannibal Auto Co.	Imp
Baxter, Ia.	Noah & McCullough	Oakland	Hibbing, Minn.	Charles Wenberg	Hupmobile
Brooklyn, N. Y.	J. S. Frazee	Pilot	Houma, La.	Dr. J. W. Warren	Hupmobile
Beardsley, Minn.	R. Herbers	Maxwell	Huntington, Ind.	D. E. Lauferty	Pilot
Bradford, Pa.	J. Rogerson	Pilot	Highpoint, N. C.	Peoples Motor Car Co.	Haynes
Brainerd, Minn.	Rosko Brothers	Maxwell	Helena, Mont.	Edward C. Follensby	Haynes
Bristol, Tenn.	Davis-Sparger Auto Co.	Maxwell	Hamilton, Ont.	Jack V. Elliott	Haynes
Borden, Ind.	Borden Motor Co.	Maxwell	Hilger, Mont.	W. A. Dodder	Maxwell
Chester, Ill.	Herschbach Brothers	Metz	Idaho Falls, Ida.	Dowd-Bucklin Auto & Supply Co.	Maxwell
Collinsville, Ill.	W. E. Jokerst	Vette	Irene, S. D.	Johnson Bros.	Hupmobile
Columbia, Mo.	J. N. Taylor	Metz	Indiana, Pa.	J. L. Culp	Pilot
Colorado Springs, Colo.	W. R. Sanner	Imp	Iona, Minn.	Iona Auto Co.	Maxwell
Cornelia, Ga.	Lee R. Hill	Maxwell	Jamestown, N. D.	J. E. Anderson Motor Co.	Maxwell
Cambria, Ia.	W. H. Davis	Maxwell	Jackson, Minn.	Jackson Automobile & Implement Co.	Maxwell
Cooperstown, N. D.	Hammer-Condy Co.	Maxwell	Jamaica, Ia.	George W. Heater	Maxwell
Calgary, Alb.	H. T. Sheffield	Haynes	Jersey Shore, Pa.	Robert M. Sallada	Pilot
Carrollton, O.	Carrollton Motor Car Co.	Hupmobile	Kiefer, Okla.	J. H. Anderson	Maxwell
Carrollton, O.	Carrollton Motor Car Co.	Chevrolet	Knoxville, Ind.	Goff & Roberts	Oakland
Carrollton, O.	R. E. Miller Motor Car Co.	Ford	Kokomo, Ind.	Edward Neary	Pilot
Columbus, O.	Dorsey W. Short	Grant	Kane, Pa.	G. E. Glatt	Pilot
Carroll, Iowa	Swaney Auto Co.	Jeffery	Loveland, Colo.	F. J. Aiken	Imp
Craig, Neb.	Dave Thurber	Auburn	Las Animas, Colo.	H. R. Jackson	Imp
Colmer, Pa.	G. H. Danehower	Hupmobile	Laurel, Miss.	E. Landrum	Maxwell
Carlsbad, N. M.	C. W. Tucker	Hupmobile	Lansing, Ia.	Gilbertson & Lenz	Maxwell
Cory, Pa.	W. E. Marsh	Pilot	Lowell, Mass.	Herbert N. Randall	Imp
Columbus, Ohio	Frank E. Jolley	Pilot	Lima, O.	Mack Garage	Saxon
Cresco, Ia.	Ohmacht Auto Co.	Maxwell	Long Pine, Neb.	Ed Engle	Hupmobile
Columbus, Miss.	Ezell & Waters Brothers	Maxwell	Lexington, Neb.	F. H. Jacobson	Hupmobile
Calumet, Pa.	Jacob Kromer	Pilot	Lincoln, Neb.	Lincoln Auto Co.	Ohio

ferred to the Palace. Earl Jones of the Jones garage has transferred his business to the Palace and has consolidated with Hayers.

San Francisco, Cal.—The Moreland Motor Truck Co. announces the appointment of George V. Lyons as the new manager of the San Francisco house.

San Francisco, Cal.—Frank M. Goodrich has been appointed manager of the Tire and Oil Service Co. at 1451 Van Ness avenue, San Francisco.

Minneapolis, Minn.—A. P. Heaney, former head of the Heaney Automobile Co., has been made manager of the La Crosse Auto Co., 921 Hennepin avenue.

Hartford, Conn.—D. K. Strong is now sole owner of the Imperial Motor Car Co., local representative for the Grant and state agent for the Imperial. Elliott Wallace is no longer connected with the concern.

Wausau, Wis.—W. R. Gragg, until now associated with the sales department of the Packard Motor Car Co., of Chicago, has become associated with the J. H. Hall Automobile Co., Wausau, Wis., as sales manager.

Kewaunee, Wis.—The Aluminum Sign Co., Kewaunee, Wis., a large maker of road markers and highway signboards, is planning to enlarge its plant because of the heavy run of business. Albert B. Leyse is president.

Fort Atkinson, Wis.—The Northwestern Mfg. Co., of Fort Atkinson, Wis., one of the largest builders of carriages and wagons in Wisconsin, has set apart a large part of its metal working shop as a garage and repair shop and is organizing an extensive

motor car service for owners. A specialty is being made of rebuilding and building bodies.

Los Angeles, Cal.—Gilbert Woodill, formerly sales manager for the Hawley-King Co., Los Angeles, who has had charge of the distribution of Oakland cars in that territory, has been made sales manager of the W. K. Cowan Co., in charge of the southern California distribution of Jeffery motor cars.

Cleveland, O.—The Richard Carburetor Co. has been incorporated with a capital of \$10,000 to manufacture and deal in carburetors. The incorporators are W. B. White, L. F. McGrath, Francis Richard, George A. McGrath and F. M. Brady.

Chicago—John V. Toomer, formerly assistant manager of the Bosch factory branch in this city, has left for Atlanta, Ga., to become associated with the Osborn Auto Supply Co., a branch of the Memphis concern of the same name.

Gallion, O.—The Dittwiler Mfg. Co., of Gallion, O., is to place on the market soon a new style of cyclecar which has attracted some attention among mechanics. The wheel-base is 100 inches and it has a body similar to a motor car. A shaft-drive will be used and the car will be sold under \$400.

Greensburg, Pa.—A permanent association has been formed in Greensburg called the Westmoreland County Automobile Dealer's Association. Charles Walters, of the Greensburg Auto Co., was elected president; Gene Gray, of the Westmoreland Motor Car Co., vice-president; William Van Horn, of the Greensburg Auto Co., secretary, and William Berlin, of Patterson & Berlin, treasurer. L. J. Ward, who formed this association and is president of Ward Brothers Automobile

Show Co., is putting on the first annual motor show for this organization. The show will be held April 9, 10 and 11.

New York.—The Norma Co. of America, maker of ball and roller bearings, will remove its offices on April 11 from 20-24 Vesey street to 1790 Broadway, New York.

Los Angeles, Cal.—The Pacific Coast Auto Specialty Co. has recently opened a branch in Los Angeles in charge of W. C. Hoff at 1044 South Olive street.

Aberdeen, Wash.—Charles Scurry has recently bought an interest in the F. & F. garage at Aberdeen, Wash. This is the largest motor car establishment in the Grays Harbor territory and acts as distributor for Reo, Stearns, Cadillac and Ford cars.

San Francisco, Cal.—P. E. Kempton recently severed his connection with the Remy Electric Co., for which he has been acting as coast manager for the past 2 years, and is at the head of the Motor Equipment and Specialty Co., with headquarters at San Francisco.

Tomahawk, Wis.—Glenn A. Foss has sold his garage and agency business at Tomahawk, Wis., conducted under the style of the Tomahawk garage, to J. Extrom and J. W. Barnes. Mr. Foss retains possession of the buildings. The garage represents the Apperson and Saxon.

Albany, N. Y.—Alex Rose, for the past year with Stowell Motor Car Co., Syracuse, agent for the Packard and Hudson, has become Berkshire county branch manager for the E. V. Stratton Co., Albany, with headquarters in Pittsfield, Mass. The Stratton company has the Hudson and Stewart accounts for that section.

Recent Agencies Appointed by Motor Car Manufacturers—Continued

PASSENGER CARS—Continued

Town	Agent	Make	Town	Agent	Make
Lincoln, Neb.	Lincoln Auto Co.	Lewis	Pittsburg, Pa.	Schott & Albrecht	Pilot
Lyons, Neb.	Samuel Shaw & Sons	Oakland	Plainview, Texas	Wayne C. Wright	Pilot
Los Angeles, Calif.	Wilshire Auto Co.	Pilot	Philadelphia, Pa.	Raymond McCormick	Pilot
Little Rock, Ark.	Joseph Brown	Pilot	Peru, Ill.	J. L. McClure	Pilot
Lynn, Mass.	J. R. Honors	Maxwell	Portland, Pa.	L. B. Bogert	Pilot
Lignite, N. D.	Jacobson & Bannister	Maxwell	Pekin, N. D.	Gulbro & Loe	Maxwell
Lynch, Neb.	Ira & Feidler	Hupmobile	Portland, Me.	Paterson Garage	Maxwell
Minneapolis, Minn.	Haynes Motor Car Co.	Haynes	Poughkeepsie, N. Y.	Cole Motor Co.	Maxwell
Marianna, Ark.	C. T. Chandler	Maxwell	Platte, S. D.	R. M. Girten	Hupmobile
Mayville, Wis.	Badger Auto Co.	Maxwell	Pender, Neb.	John Albertson	Oakland
Montevideo, Minn.	Charles J. Anderson	Maxwell	Red Oak, Iowa	C. R. Rumsey	Jeffery
Middletown, Md.	Model Garage	Maxwell	Richmond, Ind.	F. R. Bolce & Co.	Hupmobile
Marion, Mich.	Joseph Lowry	Maxwell	Rochester, N. Y.	Almy Auto Co.	Pilot
Mason City, Ia.	Barney & Harding	Maxwell	Sedro-Wolley, Wash.	S. E. Bigelow	Reo
Malvern, Iowa	Salyers & Kayton	Studebaker	Syracuse, Neb.	James Eaton	Jeffery
Millard, Neb.	Peters Bros.	Studebaker	Silver City, Neb.	J. H. Peterson	Jeffery
Menno, S. D.	E. J. Decker	Hupmobile	Sharon, Pa.	Mercer County Auto Co.	Hupmobile
Mondamin, Ia.	George W. Coffman	Hupmobile	Stuart, Ia.	Dan Pote	Oakland
Monroe, N. C.	Henderson Garage & Machine Co.	Hupmobile	State College, Pa.	M. B. Meyer	Pilot
Morgan City, La.	Morgan City Auto Co.	Hupmobile	San Francisco, Calif.	Mission Garage	Pilot
Monon, Ind.	H. B. Tull	Pilot	Spooner, Wis.	A. M. Cloud	Maxwell
Masontown, Pa.	Masontown Motor Car Co.	Pilot	Syracuse, N. Y.	Onondaga Motor Co.	Maxwell
Montrose, Colo.	John Hodges	Pilot	Santa Fe, N. M.	Nathan Salmon	Pilot
Murphysboro, Ill.	Geo. E. Crane	Pilot	Schuyler, Neb.	A. J. Grier	Chalmers
Manchester, Ia.	F. W. Webster	Maxwell	Schuyler, Neb.	A. J. Grier	Saxon
Markesan, Wis.	Charles F. Schraeder	Maxwell	Scottsbluff, Neb.	Sams & McCaffery	Chalmers
North Bennington, Vt.	Warren M. Marshall	Maxwell	Taconite, Minn.	Hope & Dolezel	Maxwell
Newark, O.	S. E. Forsythe	Maxwell	Tacoma, Wash.	Jessie E. Jones	Imp
New Market, Ia.	W. J. Parsons	Maxwell	Thurman, Iowa	Thurman Motor Car Co.	Studebaker
Nevada, Ia.	B. F. Bell & Co.	Maxwell	Torrington, Conn.	James E. Mallett	Pilot
New Haven, Conn.	James McLay	Imp	Trinidad, Colo.	C. E. Carter	Pilot
Newark, O.	Hess Auto Co.	Ford	Tamaqua, Pa.	Henry Becker	Pilot
Newark, O.	Fred Reigler	Regal	Van Meter, Ia.	A. J. Stump	Maxwell
Newark, O.	Fred Reigler	Imp	Villisca, Iowa	Tice & Evans	Hudson
Newark, O.	Fred W. Simpson	Overland	Winchester, O.	W. H. Orebough	Ford
Nehawka, Neb.	V. P. Sheldon	Hudson	Westside, Iowa	Peterson & Campbell	Jeffery
Norfolk, Va.	C. B. Cole	Pilot	Waldwick, N. J.	F. E. Weygant	Hupmobile
Nemaha, Neb.	W. W. Seid & Son	Oakland	Willow Shade, Ky.	O. P. Harvey	Maxwell
Norfolk, Neb.	C. C. Stahl	Oakland	White Plains, N. Y.	Frank H. Briggs	Pilot
Neligh, Neb.	Clyde Foreman	Oakland	Wilkinsburg, Pa.	Clyde R. Gilchrist	Pilot
Osage, Ia.	York Covey	Maxwell	Washington, Ia.	John E. Griffith	Pilot
Ottawa, Kans.	Albert Jewett	Imp	Whitesboro, N. Y.	John H. Owens & Son	Pilot
Oswego, N. Y.	E. E. Favreau	Pilot	Washington, D. C.	International Motor Co.	Car-Nation
Osoto, Pa.	Thomas J. Ardinger	Pilot	Washington, D. C.	Original Cyclecar Co.	Dydy
Oswego, N. Y.	Steam Carriage Boiler Co.	Maxwell	Western, Neb.	Holcombe Auto Co.	Oakland
Palmyra, Wis.	S. P. Nostrom	Maxwell	Wrightstown, Wis.	Joseph Kauthramer	Maxwell
Platte Center, Neb.	Platte Center Auto Co.	Maxwell	Waverly Hall, Ga.	Moultrie & Stanford	Maxwell
Pontiac, Mich.	G. G. Burt	Maxwell	Washington, D. C.	H. B. Leary, Jr.	Imp
Plattsmouth, Neb.	P. T. Becker	Hudson	Zearing, Ia.	Eagle Auto Co.	Maxwell
Parker, S. D.	H. M. Danforth	Hupmobile			

COMMERCIAL CARS

Baltimore, Md.	Howell Motor Truck Co.	Flint	Washington, D. C.	H. V. Lansdale	Reo
Baltimore, Md.	Allan W. Fulton & Co.	Republic	Washington, D. C.	International Motor Co.	Stewart
New York	F. T. Sanford Automobile Co.	Kelly-Springfield			

The Motor Car Repair Shop

ALTHOUGH it infrequently happens that a gasoline tank under the front seat is found with a ripped seam or a slight hole in the metal, many such cases have come to notice. In one instance the tank was ripped sufficiently so that all the fuel would have leaked out in a short time. The driver of the car discovered the leak and then drained the tank and proceeded to find a method of getting the fuel to the carburetor from the seat. The gasoline pipe leading to the tank was removed and forced up through a hole in the floorboards, cut out for the purpose with a jack knife. The pail into which the fuel had run was placed on the floor boards and then a squirt gun was used to force the fuel to the carburetor, as shown in Fig. 1. One person in the car operated the gun while another held the wheel. The arrangement permitted the car to operate for 3 hours when the tank was removed and the seam soldered.

A Suggested Easy Starter

On cold mornings cars equipped with electric cranking systems sometimes require extended use of the starter owing to the inability of the carburetor to send the proper charge to the cylinders. A Chicago mechanic has suggested a means of overcoming this difficulty. He proposes to construct a heating coil which is to be placed in the intake manifold as shown in Fig. 2 and ground one end of the coil. The other end is to tap the line from the switch to the generator so that every time the starting switch is turned on current will pass to the heating coil and thus assist in the vaporization of the fuel and making starting easier. This method appears to have some value, but much would depend upon the construction of the coil. It appears also that the flow of gas through the manifold would be hindered, and under certain conditions, a larger-diameter manifold would be necessary.

Some Tire Hints

Light, water and oils, especially animal oils, are rubber enemies. Light acts on the rubber in such a way as to disintegrate it, while water makes it more easily cut

How a Driver Overcame a Ripped Seam in the Fuel Tank

by sharp stones and glass. Dry rubber is not so easily cut. If there is a cut in the tread and the water makes its way to the fabric, the latter will begin to rot. This breaking down of the fabric soon causes a blowout. Oils on the rubber cause chemical action to take place which kills the material.

Keep the extra casing on the side of the car covered at all times, and it is suggested that the extra tire be used on one of the wheels occasionally. Interchanging the tires is somewhat beneficial and should be practised more than it is at present. Examine the casing carefully both inside and outside. In the inside you may find a fabric break caused by the tire striking a stone. These breaks are not usually visible from the outside and their presence is not known until a blowout occurs. The small cuts on the outside of the tire should be plugged with rubber cement or some form of plastic rubber. If the cut is large and the fabric is exposed the casing should be vulcanized immediately.

Taking a Car Out of Storage

Before running a car which has been in storage during the winter months it would be well to examine every part carefully for play. Due to changes in temperature and the action of the air on the metals, parts which appeared in adjustment a few months ago may be either loose or tight. The steering mechanism especially should be watched, for often a little rust on the knuckle pin will make turning difficult. All the wheel bearings should be examined for imperfect parts and when re-

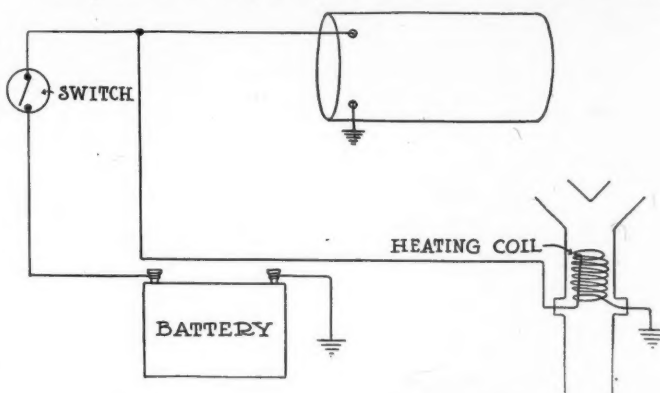


FIG. 2—A HEATING COIL SUGGESTION
How the mixture may be heated at the instant the cranking motor is switched on. The only difficulty will arise in the design of the coil. It should take sufficient current to assist vaporization and yet not take enough to cause poor operation of the starting motor

placed should be packed with grease. The valve tappets probably need readjustment. The crankcase should be flushed with kerosene and new oil placed into it. The gear-set and rear axle housings should be flushed also and a heavy lubricant used. In the spring and summer there is sufficient heat generated in the gears to thin the heavy oil.

If the clutch is of the leather-faced cone type the leather should be treated with a little neatsfoot oil or Fuller's earth to make it grip more firmly. If a disk clutch is used the housing should be well cleaned with kerosene and in the case of a running-in oil clutch new lubricant poured into the case. The clutch spring may need taking up. These essential adjustments need not be made until it is certain they are necessary. All the parts of the clutch shifter mechanism should be oiled well. The brakes should be carefully inspected and a gunful of kerosene squirted upon the bands. All the joints in the braking system should be oiled and the brake cross rods which usually operate on bearings in the frame should be oiled.

The spring leaves should be spread and oil or grease inserted between them, this small bit of labor later eliminating squeaks and making the car ride much easier. At the same time the spring shackle bolts should be oiled. The universals should be packed with graphite, and if any end play is found in these joints it should be taken up if possible. A little graphite on the rims will make tire removal easy. The tire should not show cuts, for even the small incisions should be plugged or vulcanized. Let the car rest on the tires inflated 10 pounds below normal and increase this 2 pounds each day until the car is taken on the road.

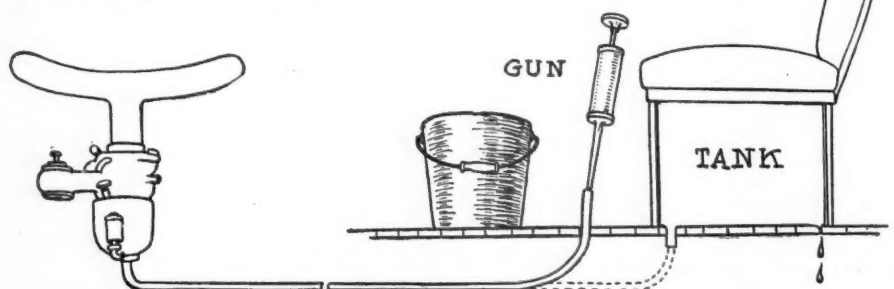
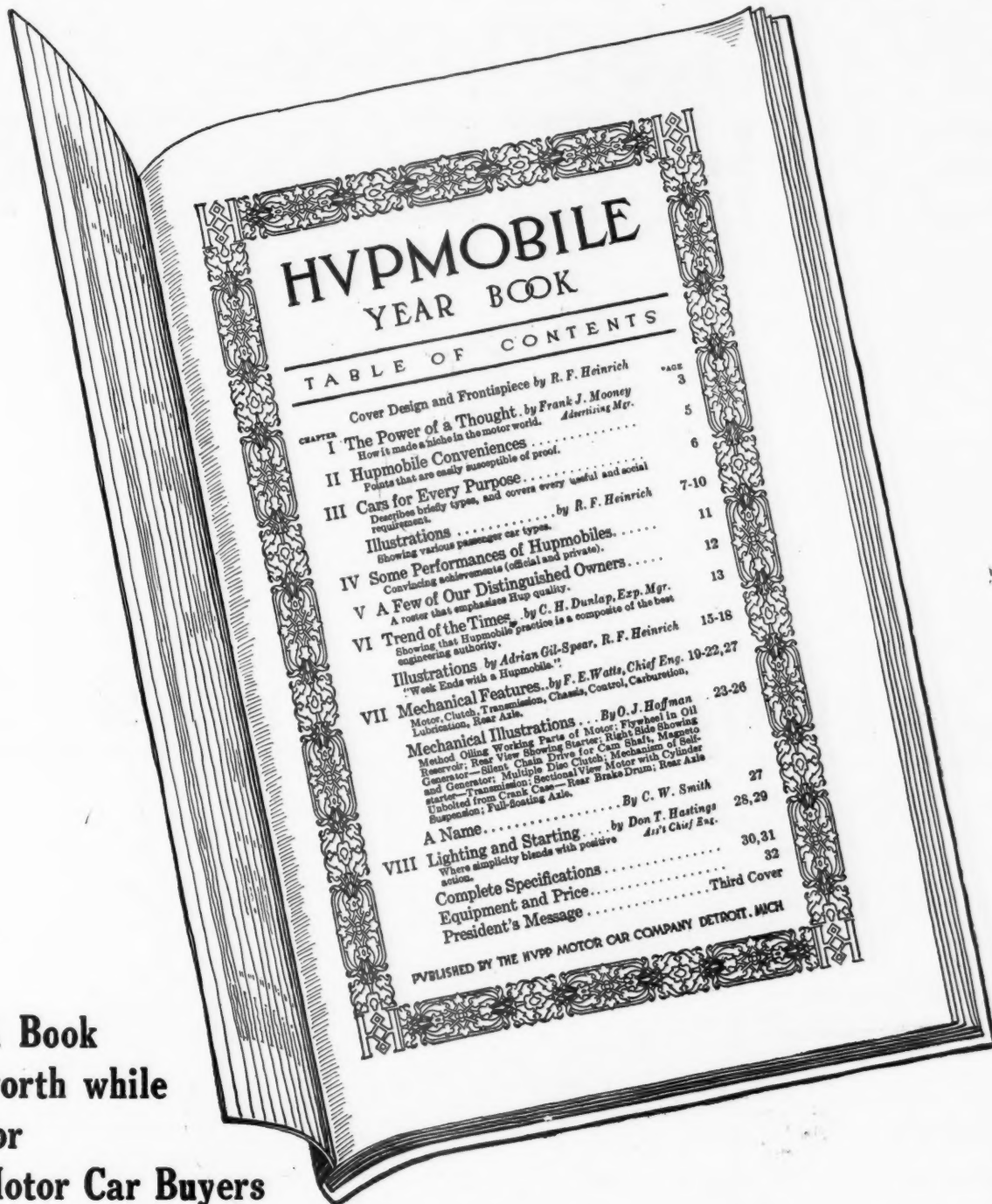


FIG. 1—GETTING TO A GARAGE WITH A RIPPED FUEL TANK

The tank is drained and the pipe extended through the floor boards. The gasoline is fed to the carburetor through the pipe as shown above by filling a squirt gun at intervals and keeping the line full



A Book worth while for Motor Car Buyers

"The Power of a Thought—How It Made a Niche in the Motor World," is the title of the opening chapter in the Hupmobile Year Book for 1914.

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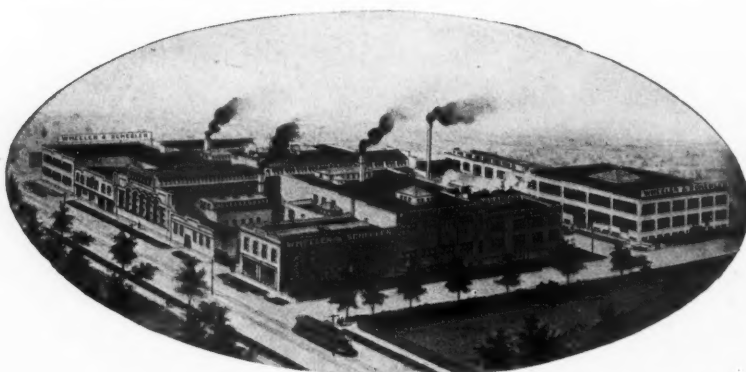


Carburetors In Use!

When a motor mechanic sees a Schebler on a motor he welcomes it as an old friend.

Do you want service and satisfaction? We give service—our instruments satisfaction.

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The
Schebler
Carburetor

WHEELER & SCHEBLER, Indianapolis, Ind.

"Pioneers in Perfection of Carburetion"

BRANCHES:

Fry & McGill Motor Supply Co.
..... Denver, Colo.
Automobile Accessories Co. Pittsburgh, Pa.
Ferris-Dunlap Auto Supply Co.
..... Dallas, Tex.
Interstate Electric Co. New Orleans, La.
Reinhard Bros. Co. Minneapolis, Minn.

Manufacturers' Supply Co.
..... Philadelphia, Pa.
Weinstock-Nichols Co. Los Angeles, Cal.
Pennsylvania Rubber & Sup. Co. Cleveland
Wheeler & Schebler Chicago
Wheeler & Schebler Detroit

Fred Campbell St. Louis, Mo.
W. J. Connel Boston, Mass.
Equipment Co. Kansas City, Mo.
Elyea-Austell Co. Atlanta, Ga.
J. C. Nichols New York City
Weinstock-Nichols San Francisco

Fairbanks, Morse & Co., Ltd., London, England
Canadian Fairbanks-Morse Co. (All principal Canadian Cities)

What signal

Ask the
Car Salesman
the car
is equipped with

Especially if you are buying your first car—find out about the signal. For if you have never driven a car you may not realize how important a good signal is or how much trouble a poor one may cause you.

WITH but one or two exceptions, every automobile today is equipped with an electrically operated signal—in place of the old fashioned bulb-horn.

There are two kinds of electrically operated signals. One is the Klaxon; the other is the "vibrator" or "buzzer" type—entirely different from the Klaxon in every particular. The principle is different—the construction is different—the note is different.

The Klaxon principle—by which the Klaxon note is made—is exclusively Klaxon. It is fully covered by patents and can be used in no other signal.

The Klaxon diaphragm is vibrated—not by means of an electric *spark* but by a cam-wheel vibrated by an electric *motor*—(in the Hand Klaxon by a train of multiplying gears.)

The Klaxon has no contact points to burn out. All working parts are of glass-hard steel. Every Klaxon is guaranteed to give *permanently* satisfactory service.

The Klaxon note is *loud*—and of great carrying power. It is sharp and clean-cut—a true *warning*.

If the car you buy is equipped with the Klaxon you are getting the best and most expensive signal possible to provide. The car manufacturer is paying from four to twelve times as much for the Klaxon as he would have to pay for a "vibrator" or "buzzer." 73 different makes of cars are now Klaxonized.

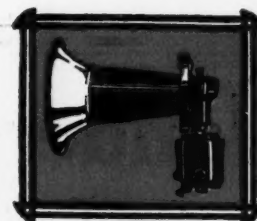


KLAXONET

Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

KLAXON

"The Public Safety Signal"



KLAXON

This advertisement planned, written and set up entirely in the Klaxon Factory. Type composition by the Klaxon Press with "Klaxon" type especially designed by Goudy.

When Writing to Advertisers, Please Mention Motor Age.

Regarding the Flanders Electric—

CERTAIN INDIVIDUALS—with apparent malicious intent—have been busy circulating misinformation about the Flanders Electric.

THESE HAVE ASSERTED that in buying and continuing this business the persons back of it are simply “cleaning up” the material that was on hand and then will quit.

RIDICULOUS is the only term that expresses it.

FIRST,—the car enjoys a splendid reputation and a good demand. It is not only up-to-date in design but it is still the fashion model that other makers are copying.

SECOND—it is a profitable business and we believe profoundly in the future of the Electric Car.

WE BELIEVE the electric has only begun—that its future is greater than its most enthusiastic advocates have believed.

AND THIRD—or first—since it is the real reply to the misstatements—this company not only purchased all the material, jigs, tools, patterns, etc., but the plant, land, and the splendid machinery equipment—so a “Clean-up” would be a foolish idea, to say the least.

NOW WE DESIRE to settle that question once and for all, and so we say to you that the Flanders Electric, Incorporated, is now managed by the old organization from top to bottom and that it is our purpose not only to make this a permanent business, but one of the largest in the industry.

SERVICE—the vital factor in an electric car business—will be just as good, just as liberal and just as prompt as these experienced men know how to give it.

Flanders Electric Incorporated

Pontiac Michigan



You Can't Tell Mother's Pie From the Baker's By Outside Appearance

But the instant you sink your teeth into them the difference is apparent.

It's just the same with the **GLBA** Electric Starting and Lighting Battery.

Imitators build batteries that look like the **GLBA**, but don't know how to duplicate the **GLBA** "insides."

If You Use the



Storage Battery

you, as well as over 100 automobile manufacturers well know there is no "just as good" battery (either inside or outside) on the market.



Willard Storage Battery Co., Cleveland, Ohio



New York Branch: 136 W. 52nd St.
Chicago Branch: 2241 Michigan Ave.

Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

Detroit Branch: 736-740 Woodward Ave.
San Francisco Branch: 243 Monadnock Bldg.

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES, CANADA AND MEXICO.

(94)

When Writing to Advertisers, Please Mention Motor Age.

CHANDLER

LIGHT
WEIGHT
SIX

\$1785



All Eyes are on the Chandler

HERE is the car that launched the era of Light Sixes, one year ago. At that time no one outside the Chandler Company would admit that a high-grade six-cylinder car could be built to sell for less than \$2000. The Chandler Car and the Chandler price—\$1785—seemed unbelievable.

Today, following a year of Chandler success, the market is *teeming* with sixes selling at less than \$2000. Everybody in the trade admits *now* that it *can be done*. And the public knows it, too. *The public is demanding light weight sixes, and demanding honest prices.*

The Chandler has the call, not merely because of priority, but because of positive, provable mechanical superiority.

Here is a Six that gives 16 miles, or more, to the gallon of gasoline—runs 700 miles per gallon of oil—average 7000 miles per set of tires—does 3 to 55 miles per hour without shift of gears—climbs every famous demonstrating hill between the Pacific and the Atlantic on high—possesses every high-grade feature found on high-priced sixes—weighs only 2885 pounds, on the scales—rides the bumps like a boat—and sells for \$1785.

You cannot buy or sell more in any six at any price

CHANDLER MOTOR CAR CO., 204-234 E. 131st Street, CLEVELAND, OHIO

When Writing to Advertisers, Please Mention Motor Age.



Features that Insure Better Service

Weight 2885 pounds, completely equipped. Exclusive Chandler motor, finest American development of the long-stroke principle.

Three genuine imported English silent chains for driving cam-shaft, pump and generator. Self-contained oiling system. Cast aluminum motor base, extending to both frames with pedestals, cast integral, for magneto, generator and starting motor. All parts instantly accessible.

F. & S. Annular Ball Bearing in wheels, shafts and differential.

Westinghouse Separate Unit Electric Starting and Lighting System.

Bosch High Tension Magneto. Chandler floating-type rear axle.

Simple, single wire lighting, with wiring run through armored conduit.

Mayo Genuine Mercedes Type Radiator. Both brakes enclosed.

Multiple disc steel and raybestos clutch. Stromberg Carburetor, with hot air and dash priming attachments. A score of other features.

Body Design and Body Types

The new Chandler body is of pure streamline design, with absolutely clean running boards and crowned fenders. Wheel base 120 inches. Left-side drive, center pivot-rod control. Exceptionally roomy bodies, of four types—touring car, roadster, coupe and limousine. Regular color, rich dark blue with silver striping.

Write for Catalogue today

The Company's Stability

The strength of the Chandler Company, is well reflected in the *character* of its principal distributors. From coast to coast many of the largest and oldest dealers have taken on the Chandler and in several instances, in order to do so, have given up agencies for cars much longer established.

But Chandler stability is even more plainly shown by the following facts:

This company has discounted *every bill* since it has been in business.

It has never borrowed money.

Its capital is intact, and a substantial surplus has accrued from its year's business.

Its car is a proved success.

The factory is producing to full capacity.

CHANDLER MOTOR CAR CO., 204-234 E. 131st Street, CLEVELAND, OHIO

When Writing to Advertisers, Please Mention Motor Age.



The generally conceded and easily proven superiority of **INVADER OIL** is not limited to just one particular grade of oil especially made for just one purpose.

INVADER OIL is made in a full line meeting all requirements of automobile, motor boat and motorcycle lubrication.

INVADER Cylinder Oil

Made in Light, Medium and Heavy Grades. Packed in barrels, 5 gallon cans (either one or two in a case), 1 gallon cans and our new one quart bullets made for the convenience of tourists. The heavy oil is recommended for motorcycles.

When Writing to Advertisers, Please Mention Motor Age.

i-O-C Gear Oil

The only oil ever made especially and exclusively for the lubrication of transmission and differential gears. Packed in 1, 5, 10, 25 and 50 pound cans, half-barrels and barrels.

INVADER Greases

Motor or Cup Grease—Non-Flowing Oil—Graphite Grease—Light Gear Compound. Packed in 1, 5, 10, 25 and 50 pound cans, 100 pound kegs, half-barrels and barrels.

INVADER cans are handsomely lithographed in orange and black and **i-O-C** cans in green and white. They make excellent displays, reflecting the high quality of the lubricants.

INVADER Lubricants cost no more than others.

Invader Oil Company, (Inc.), 79 Broad Street, New York

(Lessees of Charles F. Kellom & Co.)

The Beckley Ralston Company, Chicago, Ill.

(Middle Western Distributors and Branch Warehouses)

Philadelphia Branch, 113 Arch Street, Philadelphia

New Orleans, La. **ELECTRIC APPLIANCE COMPANY**
 Los Angeles, Calif. **W. D. NEWERF RUBBER CO.**
 San Francisco, Calif. **W. D. NEWERF RUBBER CO.**
 Omaha, Neb. **LININGER IMPLEMENT CO.**
 Detroit, Mich. **BOYER CAMPBELL CO.**
 Salina, Kansas **LEE HARDWARE COMPANY**
 Minneapolis, Minn. **KNOBLAUCH WAREHOUSE CO.**

Portland, Maine. **JAMES BAILEY COMPANY**
 New York City. **WM. JUDE, 1906 Broadway**
 Boston, Mass. **GEORGE COLLINS, 284 Columbus Ave.**
 Honolulu. **HOFFSCHLAEGER CO., Ltd.**

EXPORT SALES AGENTS:

CHIPMAN, Ltd., 8-10 Bridge St., New York

When Writing to Advertisers, Please Mention Motor Age.



Comparison Tells

Compare a three or four year old Baker with any other electric of equal age. Then you will understand why representatives of every other well known electric have acknowledged that they would rather take a second-hand Baker in trade than any other electric on the market. Better value after years of actual service certainly indicates better value when new.

Three stately Broughams, a beautiful new Coupe, and an open two passenger Roadster comprise the new Baker Electric line. As for features, you can offer anything that is desirable—shaft drive with worm gear in one car; with bevel in another; front drive, rear drive or double drive; lever steer or wheel steer; all combined with unusual beauty and recognized excellence of design.

*Write Us for Detailed Information About Baker
Dealer Opportunities*

The Baker Motor Vehicle Co., Cleveland

Announcement!

Ford Motorists Can Now Obtain

The DANN OIL CUSHION SPRING INSERT

"The Insert of 10,000 Oil Pockets"

Under the Name of—



Direct from the Schaefer Sales Corporation, 1503 Arcadia Bldg., Detroit, Michigan—the sole licensee to cut and pack Dann Oil Cushion Spring Insert for Ford cars. Dann Ford Insert comes cut to proper lengths, ready for immediate installation between the spring leaves of any Ford car. Complete instructions accompany each order. You or your repairman can readily equip your Ford springs with the Insert. Dann Ford Insert comes neatly packed in a box that looks like this

**Demand the
Original Package!**



**Accept No
Substitute!**

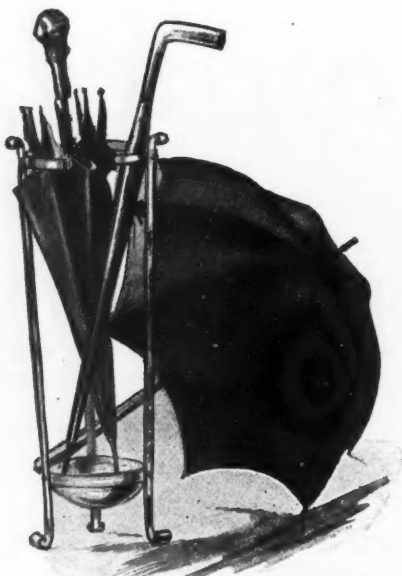
Price \$6.00

Per Set

Write for Sample of Insert and Full Information—Use Coupon

Schaefer Sales Corporation
1503 Arcadia Bldg., Detroit, Mich., U. S. A.

(COUPON)
Schaefer Sales Corporation, 1503 Arcadia Bldg., Detroit, Mich.
Gentlemen: I am interested in getting the utmost service and riding
comfort out of my Ford car. Kindly tell me how I can do so by the use
of DANN Ford Insert. Very truly yours,
Name
Address
If a dealer check here ()



Who Ever Heard of a Rubber Umbrella?

THE functions of an umbrella and an automobile top are almost identical. The purpose of each is the same, yet there is no such thing as a rubber umbrella. Is there any **good** reason why there should be rubber in an automobile top cloth, except as mentioned in our previous announcements that such cloths have been make-shifts pending the advent of a perfect automobile top cloth.

An umbrella is made of one piece, single thickness cloth, free from all chemical compositions, yet it affords complete protection.

Laidlaw Burbank Motor Cloth is one solid piece of cloth free from rubber or artificial leather compounds. There is nothing in Bur-

bank to dry out, crack, decompose, peel, blister or rub off. These weaknesses do and always will exist in rubber interlined or artificial leather surface-coated cloths.

An umbrella is an extremely practical article which opens conveniently and folds compactly, and a good one will give excellent service for years. All because there is nothing chemical about it to be affected by heat or cold or long continued folding.



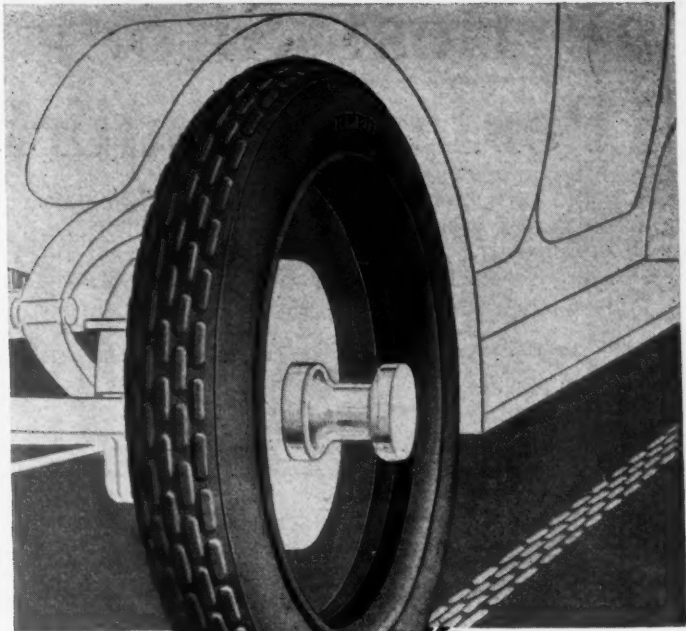
Laidlaw Burbank Motor Cloth possesses every one of the features and characteristics of a perfect top material, and retains them under the most severe and trying conditions, for a period of time longer than the life of the car.

The Laidlaw Company, Inc.

126-132 West 46th Street

New York, N. Y.

Mr. Dealer
Read the
other half
of this page.



REPUBLIC
 STAGGARD
 TREAD
 PAT. SEPT. 15, 22,
 1908

**It Pays to Sell
 REPUBLIC TIRES
 Just as Much as it
 Pays to Buy Them**

Republic Tires are Quality Tires. They attract Quality customers—and **keep** them.

Republics pay the car owner in Tire mileage and satisfaction. They pay the dealer in **Sales** mileage and customer satisfaction.

Write us for our proposition.

The Republic Rubber Co.
 Youngstown, Ohio

Branches and Agencies in the Principal Cities

Here is another "payer," the new W M Tread Tire. A Quality Tire made in three sizes, 30x3; 30x3½; 32x3½, to sell at a decidedly reasonable price.



REPUBLIC
 W M TREAD TIRES

**REPUBLIC
 MILEAGE
 PLAIN AND STAGGARD TREAD
 TIRES**

The Best Shock Absorber Is a Perfectly Lubricated Spring

A perfectly and permanently lubricated spring is the only true shock absorber. Most so-called "shock absorbers" on the market are not shock absorbers at all. They are merely rebound checks. Your springs—not your "shock absorbers"—are your chief protection against DIRECT road concussion.

Springs are interposed between a car's costly mechanism, the car's passengers, and the road surface, for the express purpose of dampening or dissipating road shocks.

The DANN OIL CUSHION SPRING INSERT



Fig. 1

gradually in extending the rubber bands of his weapon (see Fig. 1). This force is stored up in the bands, and, being released suddenly, is concentrated upon the missile which is thrown to a considerable distance.

With a spring, however, the road shock exerts a certain force suddenly, causing a rapid compression of the spring. Considerable force is thereby stored up in the spring leaves, which force is released gradually so as not to alter abruptly the level of the frame supported by the springs. In short, one big machine-damaging jolt is divided into many harmless little joggles. Instead of the jolt being concentrated at point "A" (Fig. 2) it is distributed through and absorbed along the entire spring arc "BB." It is "split up."

A perfect spring in this manner absorbs mechanism-killing vibration—takes the abrupt "kick" out of the hammer-like shocks caused by inequalities in the road surface.

No spring, however, unless properly lubricated, is a good shock absorber. Because the leaves of a spring are never stationary when in service, they must "slide" freely over one another. Upon the "slidability" of the spring depends its efficiency as a shock-absorber. If the leaves are permitted to dry or rust they no longer slide over one another, but "catch." Their bearing surfaces become rough as a file. The spring "sets." The car rides hard. The tires wear. The springs squeak—break! Their flexibility, responsiveness, shock absorbing qualities have been lost.



X-Ray view of spring equipped with Dann Insert showing how oil-packed strips are placed between spring leaves

A rusty and improperly lubricated spring conducts rather than absorbs vibration. It concentrates road shock instead of dissipating it. It carries

racking jolts more or less directly to the car's frame, and thence to the costly mechanism (see arrow "A," Fig. 2). Only a perfectly lubricated spring with perfect bearing surfaces will dissipate and absorb road shock as it is being transmitted through the spring arc (Note arrows "BB," Fig. 2).

The DANN Insert is the only construction of its kind that provides permanent and perfect lubrication between spring leaves. It is the only construction that provides smooth, permanently lubricated, "slidable" bearing surfaces between spring leaves—shiny metallic bearing surfaces that can never become "sandpapery," "scaly" or "catchy." The DANN Insert gets the maximum shock absorbing qualities out of a spring, adds life to the car's mechanism—increases the riding comfort of your passengers, prevents spring breakage, and saves wear on tires.

The DANN Insert is a thin strip of specially compounded metal designed to be inserted between the spring leaves from tip to tip. The perforations in the Insert are packed with a heavy lubricant. The spring equipped with DANN Insert has approximately 10,000 oil pockets in its construction.

Write for sample of Insert and Descriptive Literature.

Dealers: There are over 1,250,000 cars in the U. S. that need DANN Insert.

Thousands of these cars are going to be equipped with Insert in the next 3 months. If you want a part of this big business get in touch with us now. Good territory still open.

FORD MOTORISTS! The Schaefer Sales Corporation, 1501 Arcadia Building, Detroit, Mich., is prepared to supply Ford owners with Dann Ford Insert—cut to proper lengths, neatly packed in a box, and ready for immediate installation between the spring leaves of any Ford car. Complete instructions accompany each order, making it an easy matter for you or your garageman to "Oil Cushionize" your Ford springs with the utmost despatch.

"Oil Cushionize Your Springs!"

Dann Oil Cushion Spring Insert Company
2252 Indiana Avenue, Chicago, Illinois

The Insert of 10,000 Oil Pockets



Made Especially for
Cycle Car

\$ 15
COMPLETE

The First Cycle Car Speedometer in the Field

THIS is the new Stewart Cycle Car Speedometer. It is the famous magnetic type instrument, built and equipped especially for cycle cars.

It is a result of our policy of progressiveness. We watch closely every field in which there is a need for a reliable speed and mileage recording instrument. We study the requirements of each new service, and adapt the famous and successful magnetic principle to an instrument that meets the service in the most satisfactory, dependable way.

Thus we have developed the Stewart Cycle Car Speedometer. It is built on the same magnetic principle as our speedometers now used on over 1,000,000 automobiles and motorcycles—the same magnetic principle that has the endorsement of over 95% of the automobile manufacturers. Yet it is purely a Cycle Car Speedometer, built solely for Cycle Car use.

It correctly indicates *all* speeds from zero to 80 miles per hour. Its season odometer registers 10,000 miles, and repeats. Its trip odometer registers 100 miles, and repeats. It

is accurate, reliable, compact, strong and serviceable to the last degree.

And the price is only \$15 including all connections, complete. This low price is only possible because we are already producing these instruments in quantities.

Cycle Car manufacturers are beginning to "equip." The Stewart Cycle Car Speedometer is the first and most important accessory to look for. See that there is one on the Cycle Car you buy—or if you *have* bought, have one attached without delay. For sale by Cycle Car dealers, our branches and our service stations.

Stewart-Warner Speedometer Corporation

EXECUTIVE OFFICES: 1931 Diversey Blvd., Chicago

Factories: Chicago, Ill., and Beloit, Wisc.

Direct Factory Branches

Atlanta, Ga.
Boston, Mass.
Buffalo, N. Y.

Chicago, Ill.
Cleveland, Ohio
Detroit, Mich.
London

Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Cal.

Minneapolis, Minn.
New York, N. Y.
Philadelphia, Pa.

Pittsburgh, Pa.
San Francisco, Cal.
St. Louis, Mo.

Paris

17 Branches; Service Stations in all cities and large towns

Stewart Cycle Car Speedometer

MAGNETIC PRINCIPLE

When Writing to Advertisers, Please Mention Motor Age.

Firestone

RED Inner Tubes

**Another
Economy**

**For
Motorists**



BUILT
to bear

the heat of fastest travel
on hottest days.

Pure Para tubes, antimony vulcanized
and extra thick, to give greatest strength
and density and friction resistance.

They hold their shape and size and hold the
air, through longest wear and hardest use—

Most Miles per Dollar

Leading dealers who know are recom-
mending them over all other tubes ever
produced, regardless of price.

The Firestone Tire & Rubber Co.

"America's Largest Exclusive Tire and Rim Makers"

Akron, Ohio — All Large Cities

Pneumatic Tires, Truck Tires, Pleasure Electric
Tires, Carriage Tires, Cycle Tires, Fire
Apparatus Tires, Rims, Tire
Accessories, etc.

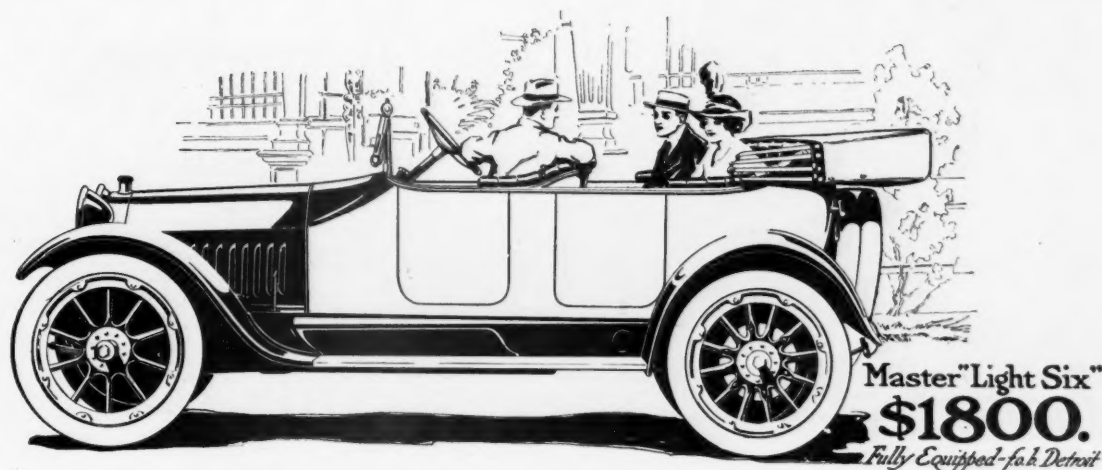
**Another
Trade-Winner**

**For
Dealers**



When Writing to Advertisers, Please Mention Motor Age.

Chalmers—1915 "Light Six"



Master "Light Six"
\$1800.
Fully Equipped—f. o. b. Detroit

Here is a New Chalmers Model--the 1915 "Light Six"

In this new Master "Six" we offer you the latest, and we believe, in many respects, the greatest product of the Chalmers factory.

Here is the most truly sensational "Six" on the market, the car for which thousands have waited.

This 1915 Master "Light Six" offers you for the first time the luxury, smoothness and flexibility of the high-powered "Six" at the low initial cost and with the upkeep economy of any comparable "four."

This new "Light Six" gives us a complete line of the famous Chalmers cars—the Master "Light Six" at \$1800 and the larger Master "Six" at \$2175. There is now a Chalmers "Six" to suit your every requirement, and we stand ready to prove that, in their classes, these two great cars cannot be equalled within \$500 of the Chalmers prices.

No Reason for Buying "Fours" Now

With the appearance of the Chalmers 1915 Master "Light Six," the last reason for driving a "four" has disappeared. For in this 1915 model the Chalmers Company has answered the last arguments of the four-cylinder builders—those of price and economy.

In all the qualities of mechanical smoothness, endurance, silence, flexibility, and good looks, the 1915 "Light Six" is like the larger Master "Six" at \$2175.

But the Master "Light Six" is built expressly for those who want a car of low initial cost and economy of maintenance.

This new "Light Six" is slightly smaller than the Master "Six." That means lower cost and makes possible the astonishingly low price of \$1800.

The Master "Light Six" is a lighter car, but not a little car. It is light enough to be easy on tires, economical of fuel and easy to handle. Yet it is not flimsy. It is built heavy enough to assure safety in any emergency and comfort on any road.

High Priced Features; Low Cost

Though the price of the 1915 Master "Light Six" is only \$1800 it has all the features of high-priced cars. Such, for instance, as: 6-cylinder en bloc motor with small bore and long stroke; cork insert disc clutch; left drive and center control; interlocking transmission gears which can't slip or be accidentally shifted; combination splash and direct oiling; cellular radiator; diamond-hard Tungsten steel valves; exclusive Chalmers design molded oval fenders; underslung Vanadium springs; non-stallable motor; Chalmers-Entz electric starter; tires carried at rear, giving absolutely clear running boards; the newest design streamline body with flush fitting doors; electric lights and horn. In a word, every feature of advanced construction and equipment which most cars in the \$2000 class will not have for another year.

A Year Ahead of Others

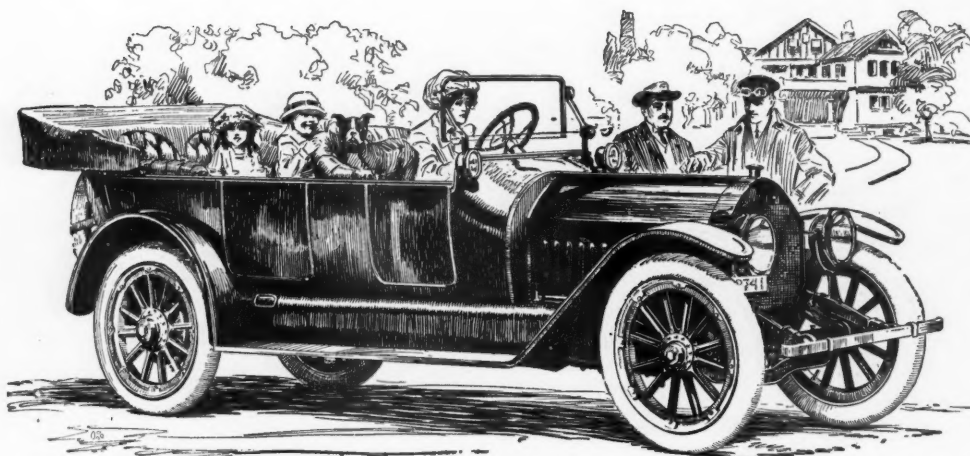
These are a few of the reasons why experts have declared this 1915 Chalmers "Light Six" the last word in medium priced 6-cylinder construction; why we claim you will find no car in the same class within \$500 of the price to equal the 1915 Master "Light Six."

The other reasons why the Master "Light Six" is one year ahead of all other cars in its class, our nearest dealer will be glad to show you in the Chalmers Standard Road Test.

1915 Chalmers "Light Six" 5-passenger	\$1800
1915 Chalmers "Light Six" Coupelet	\$2050
(Fully equipped, f. o. b. Detroit)	

Chalmers Motor Company, Detroit

When Writing to Advertisers, Please Mention Motor Age.



Why you will like the KisselKar best

You will like the KisselKar for its distinguished appearance, its luxurious comfort, its complete convenience, its mechanical simplicity.

You will like it better as you compare it with other cars, feature by feature, specification by specification.

You will like it better as you know it more intimately, as you learn from actual experience its sterling characteristics.

You will like it better as its hidden qualities reveal themselves, as its dependability, responsiveness, flexibility and latent power prove themselves in repeated tests.

You will like it better as you note the admiring glances of strangers and hear the favorable comment of friends.

You will like it better as you come to know the thorough interest and spirit of co-operation extended by the manufacturer and the dealer.

There are three KisselKar models to select from—the 40 "Four" is \$1850, the 48 "Six" is \$2350, and the 60 "Six" \$3150, each an unmatched value.

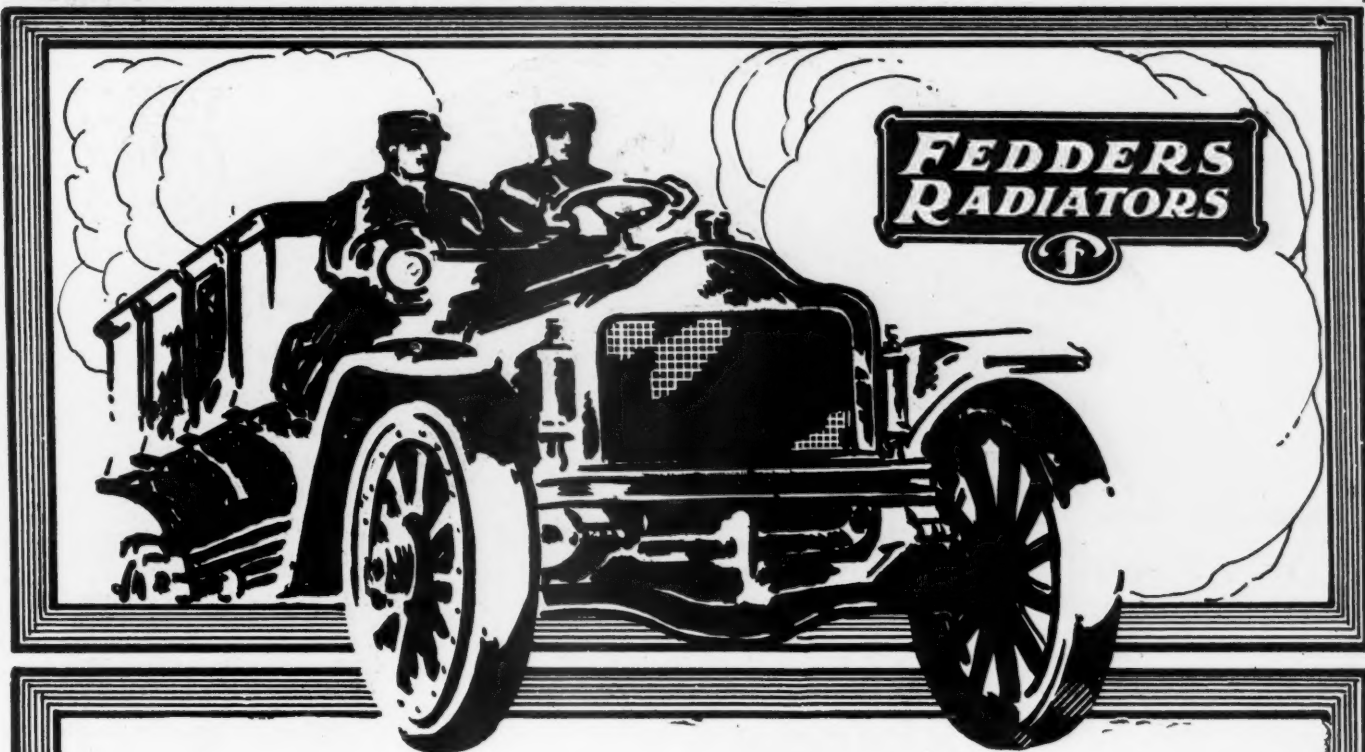
To Dealers: Before you make a connection, get the KisselKar proposition—it has new and attractive features.

KisselKar Trucks—Six Sizes—1500 lbs., 1, 1½, 2½, 3 and 6 tons capacity. Ask for truck portfolio.

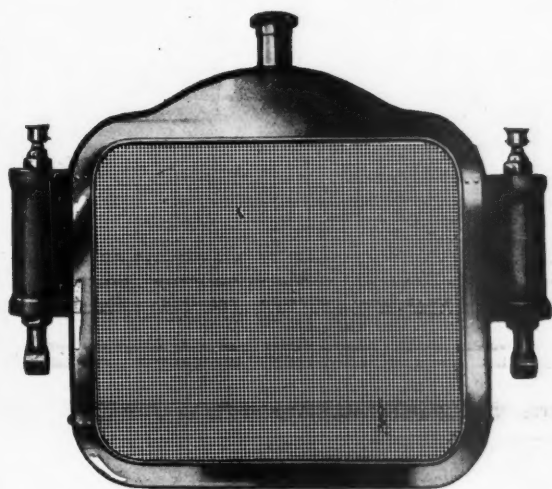
Kissel Motor Car Co., 121 Kissel Ave., Hartford, Wis.

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, MINNEAPOLIS, ST. PAUL, DALLAS, SAN FRANCISCO, LOS ANGELES, OAKLAND, Philadelphia, Detroit, Houston, El Paso, New Orleans, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn.; New Haven, Albany, Troy, Rochester, Providence, St. Louis, Marshalltown, Ia., Omaha, Hastings, Neb.; Madison, Montreal, Quebec, Toronto, Winnipeg, Calgary and 300 other principal points throughout America.

KISSELKAR



HERE is a situation that calls every detail of radiator design and construction into play.



Fedders Radiators designed and built for truck use have stood the strain of constant hard service on several of the leading commercial trucks. Year after year we have secured this business from the same concerns. This is the final test—the test of constant reliability under the most severe conditions.

The finest type of radiator suspension with ordinary workmanship on the radiator itself would not serve. Our experience has taught us how best to cope with the commercial problem in so far as radiator construction is concerned.

This illustrates how broad and comprehensive our experience has been. It is at the service of every car or truck manufacturer who may care to avail himself.

Feeders Manufacturing Co., Buffalo, N. Y.



For 1914

Factory extensions costing over \$300,000, which, with enlarged facilities in the older plants, will treble the production of

PENNSYLVANIA Oilproof VACUUM CUP TIRES

Every detail in this factory expansion has been developed along the lines of utmost efficiency—the kind of efficiency that places quality first, eliminating every motion that does not represent value to the consumer—and thereby also facilitates volume.

'Twill be a great V.C. year—1914—for dealer and user as well as maker—the same standard of success and satisfaction as in previous years, but three times more of it than ever before.

File your requirements now—and scale your orders in accordance with the extended sales opportunity now represented.

Pennsylvania Rubber Co., Jeannette, Pa.

New York
San Francisco
Omaha

Pittsburgh
Minneapolis
Kansas City, Mo.

St. Paul
Dallas
Atlanta

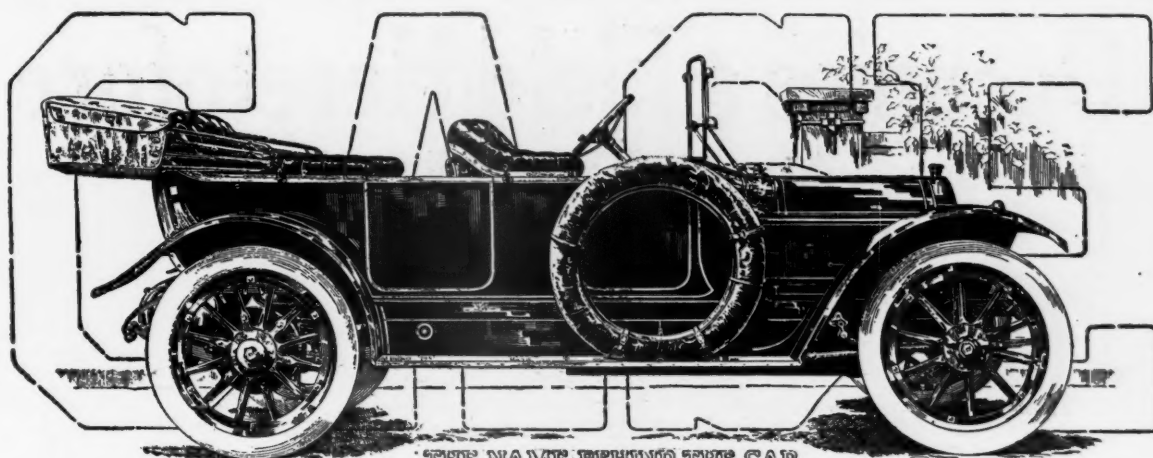
Seattle
Cleveland
Boston

Chicago
Los Angeles
Detroit

An Independent Company with an Independent selling policy



When Writing to Advertisers, Please Mention Motor Age.



THE NAME BEHIND THE CAR

Accept Our Bond of Honor 72 Years and Never Under Par

Of course the Case has complete equipment—Westinghouse Electric Starting and Lighting System, Bosch Magneto, Warner Auto-Meter, and all the other standard features. But this is not the **big** reason all motorists consider this car so favorably. Then let us see:

You have heard the Case termed "the car of *hidden values*." Better materials, better workmanship *beneath the hood and body*; added worth that only laboratory tests and miles of travel disclose. But how can the prospective buyer know that these *hidden values* really exist? Or is this claim no more than clever salesmanship?

The Bond We Give You

Consider our policy of making *customers* where making *sales* would be easier. Giving utmost value—seen or unseen—you *know must be* the basis of this policy, now 72 years old. Seventy-two years ago we began with the grandfathers making *customers* of the grandsons—the men of today.

Never a moment of this time but Case on machinery has been an honor-bond as good as gold.

Today we give you with your Case this bond for *hidden values*. The tests of time will reveal these values in this car as they have disclosed their presence in all Case products.

How We Do It

We effect immense economies in manufacture. But again this is not our *big* advantage. For our greatest saving is *this the Case is built!*

Seventy-nine branches, 500 traveling representatives and

9,000 dealers sell other Case products. Our sales force was ready, the market waiting. Then we built this car. An astounding saving in selling cost unparalleled. And we put this money into *standard equipment and hidden values*. You get them all in the Case—you get our bond of honor, too.

Our Catalog Tells You

Send for it. Learn car construction as told for the layman to understand. And see the Case. Have it demonstrated.

Then when you buy you avoid the costly price of experiment. Write us or call on any Case Dealer today. We shall appreciate your inquiry.

J. I. CASE T. M. COMPANY, Inc., ⁵⁰⁷ Liberty St. Racine, Wis.

Case Cars are sold through 79 Branch Houses and 9000 dealers in United States, Canada, South America, Philippine Islands and Europe



The Sign of
Mechanical
Excellence
the World Over

CASE

The Car With the Famous Engine

Equipment of Case "40" Illustrated Above

Westinghouse Electric Starting and Lighting Equipment
Bosch Magneto (2-Point, Dual System)
Warner Auto-Meter
8-Day Clock (Rim-Wind)
2-Tone Electric Vibrator Horn
Firestone Universal Quick-Detachable Demountable Rims
Goodyear No-Rim-Cut Tires (37x4½)
Extra Tire on Rim
Two Extra Inner Tubes
Tire Cover
Weed Tire Chains
Rayfield Carburetor, water and air heated, Dash Adjustment
Genuine Fantasote Top and Dust Hood, Side Curtains, folded in top, easily adjusted from seats
Rain-Vision Ventilating Windshield
Electric Head Lights
Side Lights, Combination Oil and Electric
Electric Tail Light
Electric Dash Lamp
Work Light on Long Wire
Robe Rail, Foot Rest and the usual Tools, Tire Repair Kit, Jack, etc.
Mayo Impulse Tire Pump
Wheel Base, 124 inches
T-Head Motor (4½x3¼)
Forty Horsepower
Price \$2300 (including all the above equipment)

(251)

Occupies a Field Heretofore Not Touched



Maxwell²⁵ \$750

Until the advent of the Maxwell "25" the vast field for a car selling at \$750 remained unscratched.

True—there have been, or there may be now, cars selling for around its price, but by reason of their very limited output they must be left out of the reckoning.

In so vast a field as that presented for a \$750 car quantity production is the only solution.

It is here that the Maxwell "25" controls the field. With the big Maxwell plants now delivering 100 cars per day, which will shortly jump to 200, the dealer handling the Maxwell line is assured of deliveries.

The brief specifications following give an idea of how much real automobile is to be had in the Maxwell \$750 car:

MOTOR—Four cylinder, L-head type, cast en bloc. Bore, 3 $\frac{5}{8}$ "; stroke, 4 $\frac{1}{2}$ ". Cylinder head cast separately with valves.

POWER—Twenty-five h. p.

IGNITION—High tension, single system magneto.

CLUTCH—Cone type in flywheel, Motobestos lined.

TRANSMISSION—Selective sliding gear type, three speeds forward and one reverse.

CONTROL—Left-hand drive; center control, foot accelerator. 16" hand wheel.

WHEELBASE—103".

TIRES—30" x 3 $\frac{1}{2}$ " clincher, front and rear.

TREAD—56" or 60" optional for South.

SPRINGS—Front, semi-elliptic, 32" long. Rear, semi-elliptic, 40" long. Rear springs shackled to goose-neck at rear.

AXLES—Front, drop-forged I-beam section, complete with spring seats. Rear, $\frac{3}{4}$ -floating. No load carried on driving shafts.

BRAKES—Internal and external, actuated on 12 $\frac{1}{2}$ " drums on rear wheels.

EQUIPMENT—Top, envelope, Jiffy curtains, windshield, gas head lights, oil side and rear lamps, horn, speedometer, Prest-O-Lite tank, tools and jack.

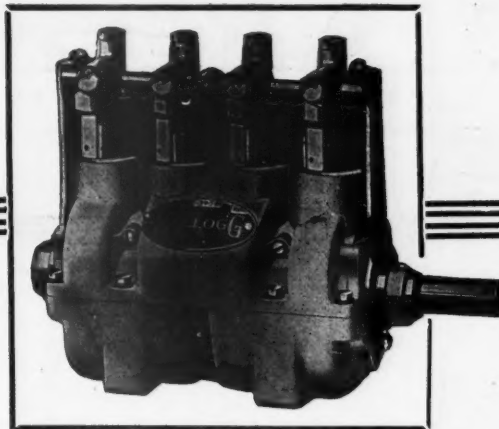
PRICE—\$750 f. o. b. factory, Detroit, Mich.

Maxwell Motor Company

(INCORPORATED)

Detroit, Michigan

Dealers and Service Everywhere



This is the announcement of the placing on the market of a full and complete line of power-driven tire pumps.

According to your requirements, you may purchase in addition to the accepted standard Four Cylinder Kellogg Tire Pump any one of the following all metal pumps:

Model A, Kellogg 1-cylinder all metal pump Model A, Kellogg 2-cylinder all metal pump
 Model B, Kellogg 1-cylinder all metal pump Model B, Kellogg 2-cylinder all metal pump
 Model A, Kellogg 6-cylinder all metal pump

KELLOGG Tire Pump

These various models of pumps are placed on the market to meet a demand impossible to be met with any one model of pump. There is no more reason for one model of tire pump meeting the requirements of every size, price and capacity of car than it is possible for one car to meet the demands of all the different car-owners with their varying tastes and requirements.

In other words, a pump suitable as stock equipment on a low-priced run-about is probably not at all suitable for adaptation to the

Used on the following cars:

Packard	Franklin
Peerless	Winton
Lozier	Havers
Stevens-Duryea	Stearns
Chalmers	Imperial
Chandler	Jackson
Willys-Knight	

high-priced, high-powered touring car or limousine.

These Kellogg Tire Pumps vary in price and capacity, but they do not vary in efficiency or general construction. Each pump is a Kellogg Pump in all that word means.

In addition to supplying these standard sizes, one of which in most cases will meet the requirements of most cars built today, we are also in a position to produce

special pumps in quantities, such as may be required by any manufacturer who does not find one of these stock products suitable.

KELLOGG MFG. COMPANY, Rochester, N. Y.

NEW YORK
1733 Broadway

CHICAGO
1112 South Michigan Avenue

SAN FRANCISCO
444 Market Street

We are rapidly establishing a chain of Service Stations reaching from coast to coast which will shortly be at your disposal in every important city.



MANZEL

ENGINE DRIVEN TIRE PUMP



Half Size
Weight
7 lbs.

Is Your Car
"Fully Equipped"?

We have complete fittings for attaching to Abbott-Detroit, Buick, Cadillac, Cole, Carter car, Chalmers, Hudson, Howard, KisselKar, Maxwell, Mitchell, Oakland, Overland, Packard, Paige-Detroit, Reo, Speedwell, Studebaker, Stutz and other cars. We furnish everything complete for attaching the pumps and any one can connect them. The services of a mechanic are not required. No special tools are needed. There is no machine work of any kind to be done. Complete installation can be made in less than one hour's time.

No Car Is Fully Equipped Without a Power Driven Tire Pump

Today the wide-awake car buyer is keenly alert to the presence or absence of the power pump on the so-called "fully equipped" car. The up-to-date car manufacturer is putting MANZEL PUMPS on his car because they help to sell the car.

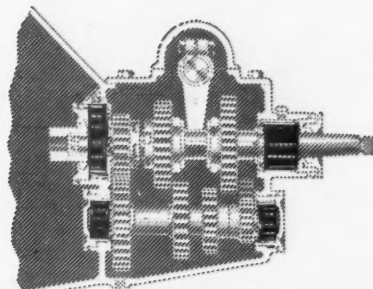
A power pump of some sort is so much a necessity that any buyer who pays a reasonable price for a car should confidently expect to find it so equipped. And the MANZEL TWO-CYLINDER ENGINE DRIVEN TIRE PUMP is so simple in principle, so sound in construction and so rapid in operation that it is the one selected

by those who are most familiar with pumps.

THE MANZEL can be quickly attached to any car with an exposed shaft. It inflates the largest tire in two or three minutes. It makes a saving of 20 to 25% in tires by keeping them properly inflated. It weighs less, lives longer than the complicated four-cylinder type and it gives the most complete satisfaction on the thousands of cars on which it is now equipped.

Let us send you our interesting literature which will doubtless be of much value to you.

Manzel Brothers Company
306 Babcock Street
BUFFALO, N. Y.



Hyatt Bearings in Unit Power Plant Transmission

Did you ever get on a bad, rutty road and have to grind along mile after mile on first or second speed, with your car twisting and straining all the time? Some times you wonder how the car ever stands it.

Most of this distortion and weave in the car passes through the transmission bearings.

Hyatt Quiet Bearings are pre-eminently fitted to withstand all this wracking. They have spiral rollers, made of heat treated nickel steel, that absorb shocks and vibrations and relieve the gears and shafts of excessive strains.

This is an exclusive Hyatt feature, and the principal reason why so many leading automobile manufacturers use them in transmissions.

Two books, one about motor car bearings in general for prospective purchasers, the other for automobile owners, will be sent on request

"Hyatt Quiet Bearings"

HYATT ROLLER BEARING Co.
DETROIT, CHICAGO
NEWARK, N.J.



Owners of high-grade cars now demand a timepiece in appearance and accuracy worthy of their cars. This accessory can no longer be a mere "afterthought"; it must be an integral part of the car, rendering an equal degree of dependable service.

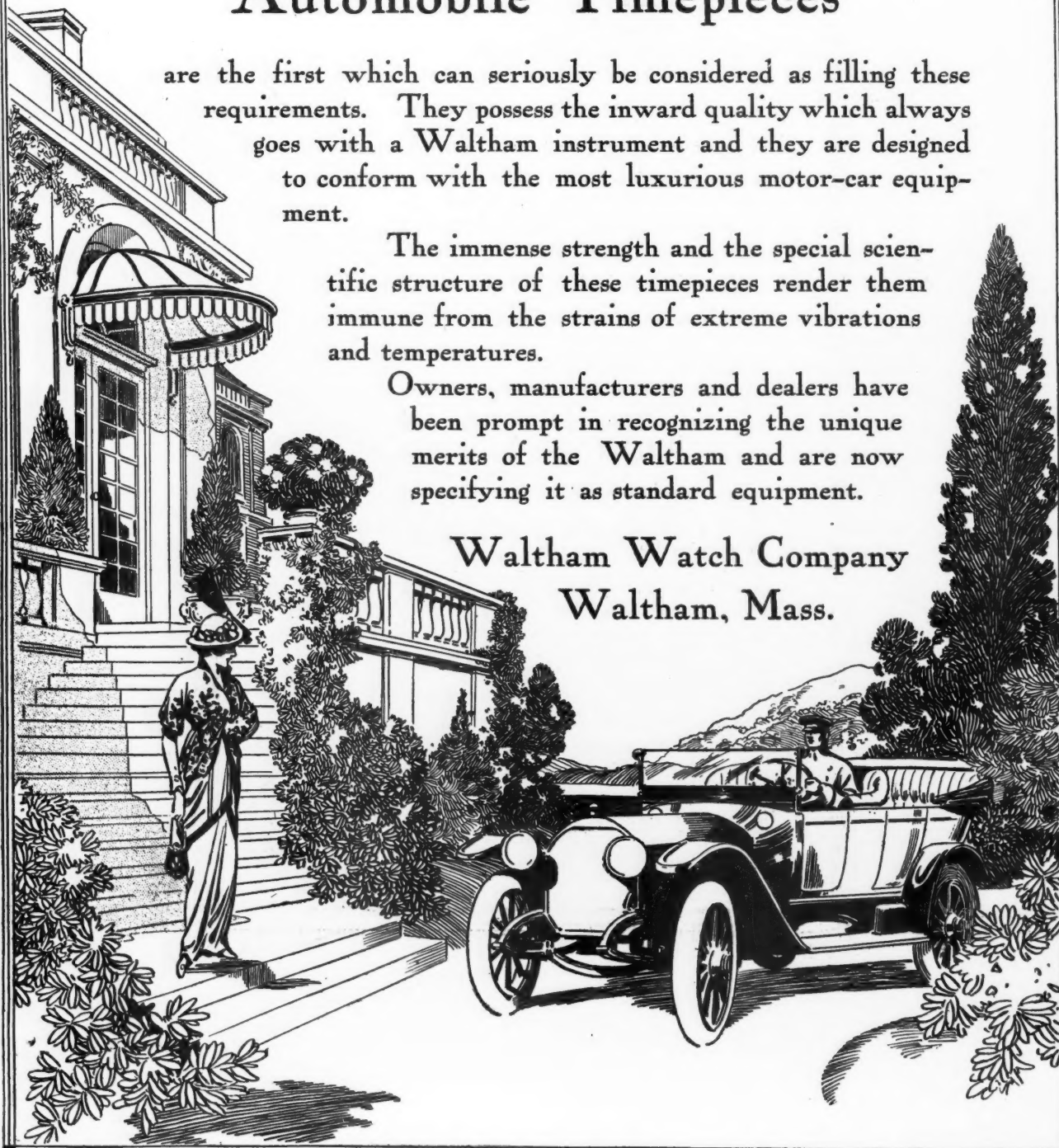
Waltham Automobile Timepieces

are the first which can seriously be considered as filling these requirements. They possess the inward quality which always goes with a Waltham instrument and they are designed to conform with the most luxurious motor-car equipment.

The immense strength and the special scientific structure of these timepieces render them immune from the strains of extreme vibrations and temperatures.

Owners, manufacturers and dealers have been prompt in recognizing the unique merits of the Waltham and are now specifying it as standard equipment.

Waltham Watch Company
Waltham, Mass.



HIGH *and* LOW TENSION MAGNETOS



MASTER VIBRATORS ROAD SMOOTHERS AUTO LOCKS

Attention Ford Owners!



← This is the Only Trade Mark Under Which K-W Master Vibrators are Sold



\$16 with K-W
Autolock Switch

You are particularly cautioned against imitations apparently resembling the K-W Master Vibrator in many details and being offered by some dealers under private trade names. **Look for the K-W Trade Mark and serial guarantee number.**

A handsomely finished box means nothing. It's the electrical detail that makes a Master Vibrator reliable and efficient, and years of service **alone** will prove this. Over 90,000 K-W Master Vibrators giving efficient service is proof that the K-W is electrically right. That is why every K-W Master Vibrator is "Guaranteed for Life."

The K-W Master Vibrator is the Standard of Excellence all over the world. It's a tried and proven accessory for a Ford car, with 100% efficiency.

ITS USE MEANS

Perfect Ignition—More Power
One Adjustment Instead of Four
A Hotter Spark—Easier Starting
A Smoother Running Engine
Less Carbon Deposits—Less Gasoline Used
Cleaner Spark Plugs—No Worry

Only one adjustment. It takes the place of four separate vibrators in your coil, giving you one fast vibrator and a powerful condenser, which insures absolute synchronism.

The K-W Master Vibrator, while resembling an ordinary vibrator, is really a scientifically constructed magnetic circuit breaker which times the spark more accurately and gives better and surer ignition than a high tension magneto. It can be put on in half an hour, no change in the car being necessary.

The K-W Autolock Switch can be installed on your Ford car in five minutes—absolutely prevents theft—and costs but \$3.50.

Write for folder.

Your nearest dealer will gladly show you the merits of the K-W Master Vibrator. Literature on request.



\$15 with Regular
Kick Switch

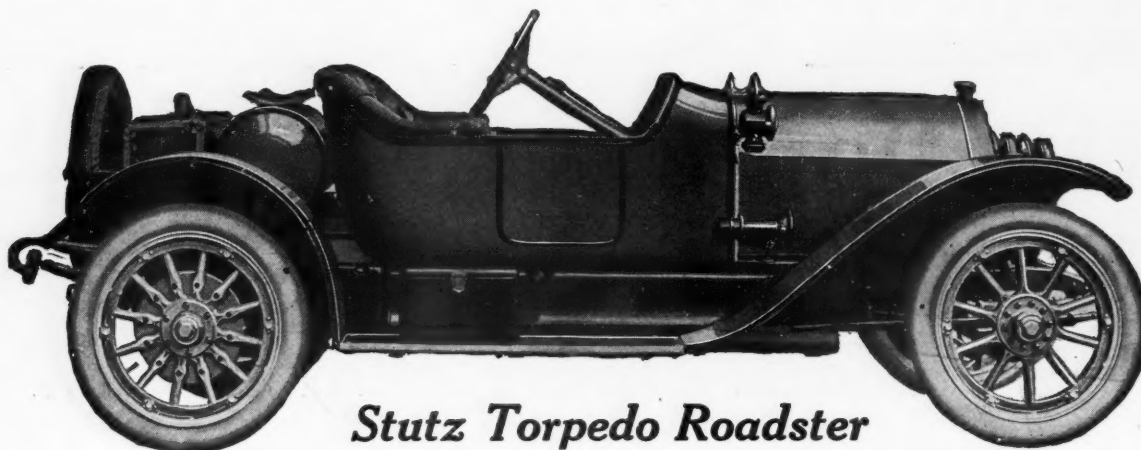
HEADLIGHTING OUTFITS

THE **K-W** IGNITION CO.
2853 CHESTER AVE. CLEVELAND, OHIO, U.S.A.

SPARK COILS SPARK PLUGS



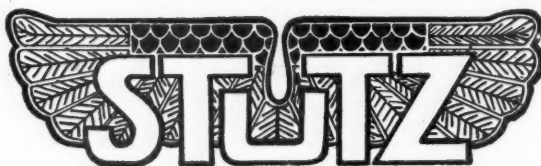
**Holds the World's Road Race Record
for 301-450 class—75.03 miles per hour,
former record 74.42**



Stutz Torpedo Roadster

Four-cylinder—\$2000

Six-cylinder—\$2250



Suit yourself about which model, but be sure it's a STUTZ

Stutz cars are sold to the "motor wise" who have their own ideas about which model to buy—a "four" or a "six."

We build both, and assume that you know what you want. We do not attempt to tell you which car is better *in theory*.

Stutz Fours and Sixes are built on identically the same chassis. The motors develop exactly the same horsepower. So, if you really appreciate high grade construction in a motor car, take your pick—a Stutz Four or Six?

The extra cost of the Stutz Six is only the extra cost of six-cylinder motor.

A Trustworthy Car

In performance, on track or boulevard, it is impossible to get a more trustworthy car than the "Sturdy Stutz."

Thousands of Stutz owners are finding that out. Power—Speed—Endurance—Freedom from mechanical trouble—these qualities make the Stutz the *Champion Road Car*.

Dealer's "Best Bet"

Last season we were unable to make contracts with any more dealers. We had just enough cars for those who had been with us from the first.

We are preparing to enlarge our field of operations and have a money-making proposition, based on merit, for the right dealers.

Write today for our proposition and Booklet No. A-2, Series E. Don't wait.

Stutz Motor Car Company

- - -

Indianapolis

STANWELD RIMS

A RIM TO REMEMBER

STANWELD Demountable Rim Number Sixty is a rim to remember.

If you've ever used it, you can't forget the ease with which you changed casings and repaired tubes.

The Number Sixty removes the hardest labor of tire-changing and tube-repairing. It eliminates the exasperating exertion of separating the casing from the sides of the rim.

The side-rings of the Number Sixty are made endless, smooth, and clean. They prevent rim-cutting of straight-side tires as well as of clincher tires.

The Number Sixty comes off the wheel quick and easy. Two turns of six clamps do the work. Rust and dirt don't hinder the operation.

And when the rim is off the wheel, you can repair the inner tube without ripping, tearing, or pulling the casing off the rim. Just unlock a little toggle-joint with a screw-driver, and pull out the inner band. The side-rings remain on the casing.

If you buy a new car, you should get Stanweld Number Sixty Rims without extra cost. Or you can have your old car equipped with Number Sixty Rims for a very reasonable sum. Ask for them. But first, send for our booklet.

The Standard Welding Co.

*Pioneers and World's Largest Producers
of Rims for Motor-Driven Vehicles*

Main Office and Factory CLEVELAND

Distributors in Principal Cities



The leading makes of pneumatic tires are guaranteed only when applied to rims bearing one of the accompanying inspection marks. You'll find these marks on Stanweld Rims.



When Writing to Advertisers, Please Mention Motor Age.

ANNOUNCING

The APOLLO

The Standard of Perfection

**The Latest Achievement in Electric Warning Signals
Insuring Permanent Efficiency at a Minimum Cost**



Cheap in
price but
not in
quality

Type "L" \$6.⁰⁰
Length 10"
Type "S" \$5.⁰⁰
Length 9"

*Guaranteed for Three
Years Perfect Service*

Compels Instant Attention—*Courteously*

The Apollo Electric Horn has been perfected to offer to the trade a warning signal which will stand the Efficiency Test for all time.

Its tone is compelling but courteous. Its ingenious mechanism is original and especially designed for durability, simplicity and strength found probably in no other horn on the market today.

We, as manufacturers of The Apollo Electric Horn, are in the enviable position of having been for the past eight years the Largest Manufacturers of Auto-Horns in the United States, and our Three Years' Guarantee is backed by the largest, best equipped organization in the world. That alone should mean much to you.

According to statistics, the life of an ordinary horn is fifty thousand signals. The Apollo has stood a test of over Two Hundred and Ten Thousand Signals and to all appearances ready for two hundred and ten thousand more.

Deliveries Can Be Made Immediately

Automobile Supply Manufacturing Co.

220 Taaffe Place

America's Pioneer Horn Maker

BROOKLYN, N. Y.

CONNECTICUT

Master Vibrator For Ford Cars



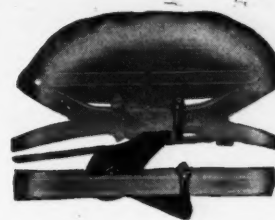
A small, neat, compact master vibrator which draws minimum current from magneto. Has standard "Connecticut" switch so that it fits flush and does not detract from trim appearance of dash.

Install one on your Ford. It gives magneto service—insures easy starting—increased power—smooth running engine—freedom from frequent adjustment of coils. Price, \$9.00. Delivered on receipt of price.

Write for Bulletin No. 36

Connecticut Tel. and Electric Company, Inc.
MERIDEN, CONN.

Shock Absorbers



Built on the only true, shock-absorbing principle. "Takes the bumps out of all roads"—never needs adjustment after being installed properly. Adjusts itself automatically to all road conditions and varying weight of loads.

Special for Ford Cars

Real shock absorbers, possessing all the features of those installed as regular factory equipment on many leading makes of cars. Not a "cheap" device, but a superior article, honestly made and guaranteed to give service.

Make your Ford "a parlor car." Equip with "Connecticut." Price, \$22.50 per set.

Write for Bulletin No. 44

Connecticut Shock Absorber Co., Inc.
MERIDEN, CONN.

You put away your tools while your tire is being pumped with a

MAYO SPARK PUMP

All you do is repair the puncture. Your motor inflates your tire for you. You make a quick get-away—while the other fellow is still sweating over his hand pump.

A Mayo will fill your tires five times faster than a hand pump. It will inflate the largest tire in from 3 to 4 minutes. It pumps nothing but pure, fresh air. Instantly attached by substituting for any spark plug.



Try One FREE
On Your Car for 30 Days

Complete With
Pressure Gauge

Price \$10.00

Mayo Quick Detach-
able Spark Plug
\$1.50 Extra

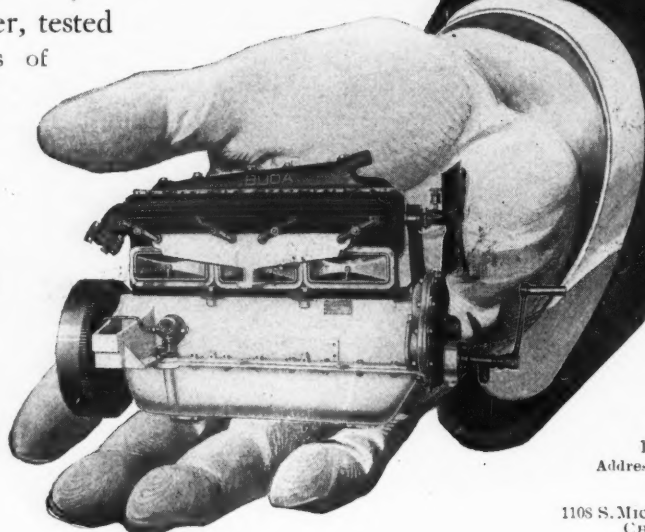
**Mayo Mfg.
Company**

55 East 18th St.
Chicago, Ill.

BUDA MOTOR

"The part that sells the car"

Tested by the maker, tested by the manufacturers of cars and trucks, tested by the car owner. Tested for price, tested for endurance, tested for economy, tested for power, tested for silence, tested for oil consumption, tested by every user in the great test of daily use, year after year, *tested* and *tested* and *tested*:— and



The
Motor
Shown is
BUDA Six
Model "SS-3"—
3 3/4 x 5 1/2

There's a BUDA
motor for every use.

THE BUDA COMPANY

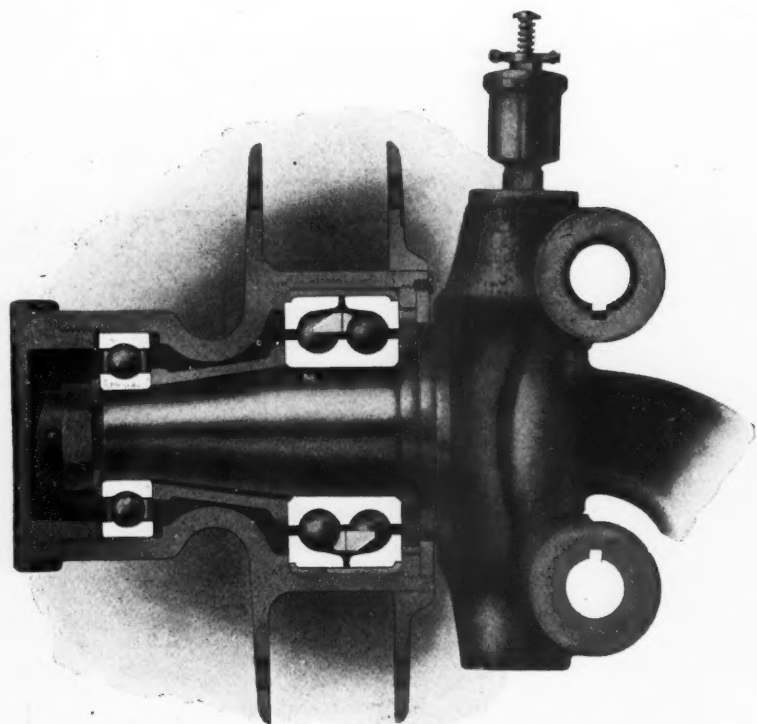
FACTORY, HARVEY, ILL., (Chicago Suburb)

Address all correspondence to our **Factory Representatives**

BRANDENBURG & COMPANY

1108 S. MICHIGAN AVE., FORD BLDG., 57TH & BROADWAY,
CHICAGO DETROIT NEW YORK CITY

EACH NEW TEST A NEW TRIUMPH



The Ideal Front Hub Bearing—

Least Friction
Least Wear
Least Operating Expense

The review of 1914 pleasure car models published by The Automobile, shows 61 per cent of the front wheels mounted on ball bearings exclusively.

The ideal ball bearing front hub employs the New Departure double row or double capacity bearing, which not only carries greater radial load than any other type of anti-friction bearing, but at the same time sustains the severe end thrust stresses, which occur at this point, without fuel consuming friction or rapid deterioration.

The New Departure Mfg. Co.

Bristol, Conn.

WESTERN BRANCH, 1016-17 FORD BLDG., DETROIT

The "Goat"

Greatest Little Trouble-Taker on the Road

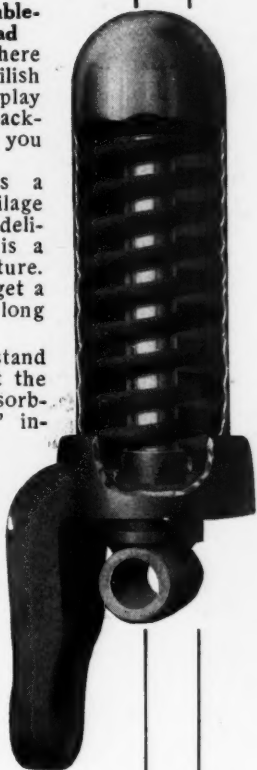
Mr. Car Owner—there are a hundred devilish jolts waiting to play havoc with your backbone the next time you take a long ride.

Every jolt means a mashing of cartilage and a yanking at delicate nerves. It is a smash-up in miniature. That is why you get a lame back after a long run.

You don't need to stand for the jolts. Let the Halladay Shock Absorber be the "goat" instead of your backbone. The Halladay is made especially to take and kill instantly every shock, before it can be transmitted to the body springs.

Save your eyes, your nerves, your backbone, by installing a Halladay Shock Absorber. Put your car in the Packard class of easy riders.

Install the Halladay and forget that there are poor roads.



HALLADAY SHOCK ABSORBERS *for Ford Cars*

The Halladay Shock Absorber combines features that no other form of absorber contains. It works directly over the axle, thus absorbing the shock instantaneously. The action on the springs is **direct**—no cramping nor binding. Springs are packed in grease and will lubricate automatically. Dustless, leakless, handsome. Strictly high quality. Guaranteed.

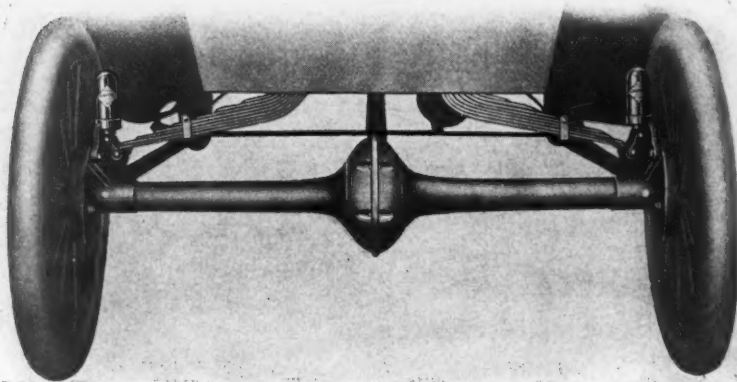
Saves car, reduces tire expense one-fourth to one-third. Applied in 20 to 30 minutes without machining.

Sold you at our risk; returnable and money refunded if not satisfactory.

L. P. HALLADAY CO., Dept. 102 Streator, Ill.

\$7.00 per pair front or rear. **\$12.50** for set of four. Send today under our absolute guarantee.

DEALERS' TERMS. Excellent dealers' terms. Write for particulars.



On a certain Pierce-Arrow limousine belonging to a famous New York jeweler an Englebert steel-stud tyre recently ran 4,000 miles on a rear wheel. Then it was changed to a front wheel, where it has now passed the 7,000 mile mark and is still going.

The owner says of our tyres—"In every case we have run the tyre down to the last few layers of fabric."

Dealers, get in touch with us!

TYRES

MADE IN BELGIUM

ENGLEBERT

ENGLEBERT TYRE CO., 1928 BROADWAY, NEW YORK



When Writing to Advertisers, Please Mention Motor Age.

Sell The Ames at

\$8.00 \$10.00 \$12.00 \$14.00 \$15.00

according to spring widths

and assure your customers more satisfaction in good riding—safety and freedom from care—annoyance and adjustment.

The Ames Equalizing Spring gradually checks recoil just as the chassis spring cushions down-thrust.

Immediate shipment in 1½" to 2½" widths.

Longer clips and spacing block included in price of shipment.

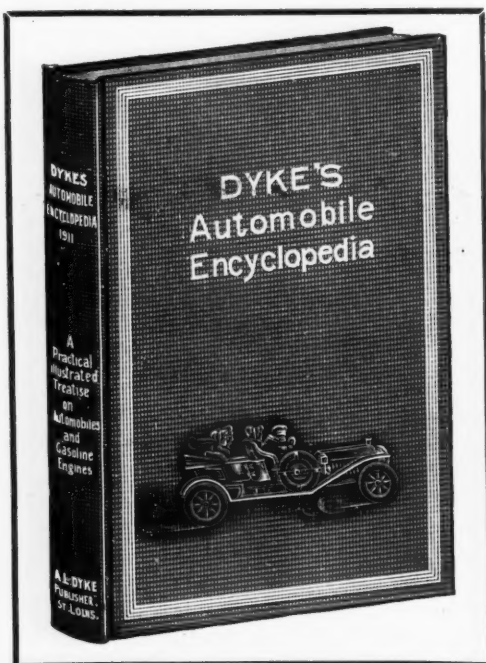
Easy to put on—stay put and require no further attention.

CLARENCE N. PEACOCK & COMPANY

Exclusive Licensees

**1790 Broadway
New York, N. Y., Dept. I**

**5986 Center Avenue
Pittsburg, Pa.**



Price Three Dollars postage prepaid

Address Book Department
CLASS JOURNAL COMPANY
910 So. Michigan Avenue, CHICAGO, ILL.

Dyke's Automobile Encyclopedia

is a simple, practical book written by A. L. Dyke, publisher of the first practical

treatise on automobiles in America. This revised and enlarged Edition is especially prepared for those who want to learn the principle and construction of all parts

of all cars, thereby enabling one to make repairs and adjustments in an intelligent manner.

This book explains the principle and construction of different ignition, carburetion, cooling and lubricating systems, together with the different types of engines and their valve systems; how to set valves, time the ignition, etc.

THE DIGEST OF TROUBLES is very complete—by turning to the index the CAUSE and REMEDY of the trouble is given.

THE ADJUSTMENT AND REPAIR SUBJECT is probably the most interesting. The subject of repairing begins with cleaning a car; cleaning carbon, chemically and mechanically; grinding valves; testing compression; taking up lost motion in valve stems and plungers; setting valves and timing the ignition; how to set all leading magnetos; scraping bearings; how to test for knocks and how to locate them; meshing the timing gears; fitting piston rings; carburetor repairs and adjustments; rewiring a car; ignition troubles and remedies; timer troubles and remedies; cooling troubles; how to clean and repair radiators; how to take up wear in differential; how to adjust the steering device; how to treat the clutch; lining up wheels, etc.

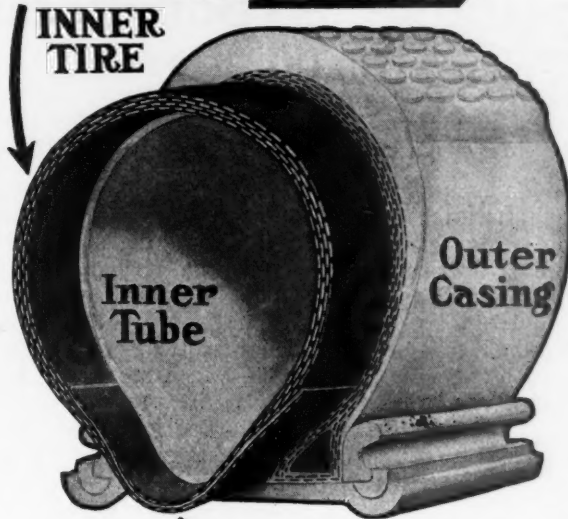
OTHER SUBJECTS—such as Building a Garage for Home or Business; Equipment of a Shop; Tires; Tire Repairs; Vulcanizing; Lighting a Car; Self-Starters; the Assembly of a Car; Transmission; Axles; Brakes; Differentials; Laws; Insurance; Metric Measurements Connected with English Measurements; Care of a Car.

ANOTHER FEATURE OF THE BOOK is the building-up process of a car, from the axles to the body; each part is added by means of progressive charts: First the springs are mounted on the axles, then the frame, then the power plant is mounted on the frame and each and every part is added until the car is completed. In this manner the reader learns the relation of one part to the other. The engine and transmission are assembled in the same manner.

THIS BOOK IS DIFFERENT. The matter is arranged in the form of instructions, of which there are 40. The type is clear. There are over 1000 illustrations, in the form of large, clear charts, of which there are 239. The reading matter is so clearly worded, a ten-year-old boy can understand.

1914 EDITION NOW READY, with 36 pages, 107 illustrations and 118 questions on the principle, construction and care of Electric Starting, Generating and Lighting Systems.

INTERLOCK



Pressure Lock Flaps

It explains fully just how Interlocks will save a big part of your tire expense, and also free you from the bother and worry of tire trouble. This booklet is full of new tire information, things not generally known or understood about tires, which will materially assist you in obtaining greater mileage. Please state what size tires you use.

To Dealers! You should handle Interlocks—over a quarter of a million are now in use. One dealer sold 250 in 1911; 2,500 in 1912; 4,750 in 1913. That tells the whole story, for nothing proves positive merit like repeat orders. Write us promptly for information and NEW CATALOG.

DOUBLE FABRIC TIRE COMPANY, 533 W. 11th St., Auburn, Ind.

Saves Millions For Motorists!

Statistics show that over \$100,000,000 worth of tires are "scrapped" each year, because of blow-outs in the fabric, and every motorist knows that most of these blow-outs (probably 90% of them) occur before the rubber tread is more than half worn out.

Interlocks save this waste by doubling the fabric strength—for example, an \$8.45 Interlock will make a \$24.35 (34 x 4) tire last twice as long, saving the owner \$15.90 or \$63.60 per set. (Other sizes proportionate.)

Tire makers cannot provide this extra strength by simply adding more plies of fabric in the building of a tire, because it is well known that this would cause the plies to "separate" or pull apart.

Interlocks Offer the Only Way

of so increasing the fabric strength of your tires as to make them Blow-out proof and practically puncture proof—with the result that they will last until the rubber is completely worn out, and thus give about twice the usual mileage.

Interlocks are particularly important this year because with definite mileage guarantees on tires being now removed, if you have a blow-out because of some excessive strain or stone bruise (even within the first 500 or 1,000 miles) the loss is yours.

Interlocks Do More than Increase Mileage

—they give the motorist an entirely new pleasure in the use of his car by freeing him from all worry and bother about blow-outs, or roadside tire repairs. In addition to extra mileage, Interlocks again pay for themselves by the saving of tire repair expense.

Guaranteed against blow-outs for one year. No matter what the reason, if you damage an Interlock, our Factory Guarantee Tag now insures a speedy and generous adjustment from the factory for a full year from date of purchase.

Write For Our Booklet and Price List

A Car of Greater Worth Than \$1195 Would Ever Before Buy

Westinghouse Electric Starting System
Westinghouse Electric Lighting System
Motor Driven Tire Pump
Unit Power Plant
Long Stroke Motor Left Side Drive

Equipment

Stream Line Body—Concealed Hinges
Enclosed Valves Center Control Levers

Gasoline Tank under Cowl Dash
Demountable Rims
Floating Rear Axle with Pressed Steel Housing
Goodyear No-Rim-Cut Oversize Tires
114 Inch Wheel Base

In all the 31 years of its existence, the company behind this Model 30 has never been "re-organized." It is a *stable* Company. Since 1882 it has stood for the highest standards of manufacture. Its automobile product is just as substantial as its business policy—which has always been to give more than the price asked demands.

The Model 30 is a car of maximum value

The Bartholomew Company

at a minimum figure. Factory equipment and efficiency have enabled us to reduce production cost—and the individual buyer *profits* thereby. In appearance—equipment—construction—from every standpoint of car excellence this Model 30 is a *good* car at a *low* price. Dealers will do well to learn more about this \$1195 automobile—also about our Model 36, selling at \$1840. Please write for catalogs.

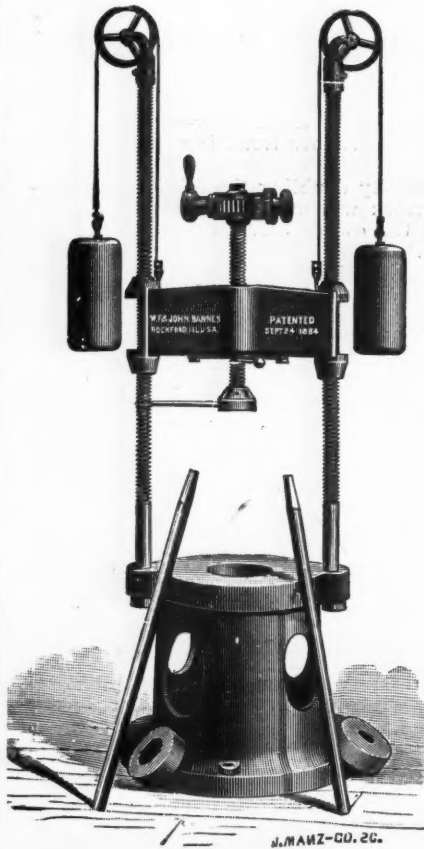
215 Glide Street, Peoria, Illinois



Get Our Agency Proposition

Glide
Model 30

When Writing to Advertisers, Please Mention Motor Age.



—BARNES—

No. 2 Adjustable Arbor Press

Price \$100.00

Distance between Screws, 20 inches
Head and table, 36 inches

Capacity, 50 Tons
Weight, 870 lbs.

This exceedingly convenient press is designed for use in garage machine shops for pressing shafts into and from pulleys, gear wheels, hubs, etc., and for straightening automobile shafts. The engraving shows the construction and principle of operation of the machine very distinctly. From the table rise two screw guides, upon which the cross-head is adjustably supported, having two semi-screw nuts and toggle mechanism by which the cross-head is held fast or released for vertical adjustment. The cross-head is balanced by weights, as shown, and a steadying bar connects the press cup with the press screw. On the press screw is fixed a spur-toothed ratchet wheel embraced by a forked lever head fulcrumed to oscillate on the press screw. A double acting spring pawl engages the teeth of the ratchet, and to the press screw a hand crank is fixed.

After the object has been placed in press the cross-head in which the central screw is placed can be instantly dropped to the work, and with a few turns of the screw the required pressure is applied. An important saving in time is thus effected, as compared with the method heretofore followed of placing a quantity of blocks on the bed plate, or running a long screw up and down until it reached the material to be pressed.

—Manufactured by—

W. F. & John Barnes Company, 444 Ruby St.
ROCKFORD, ILL.

The Dayton Airless Tire a Tremendous Success

Sales doubling every three months. — We are increasing production capacity accordingly.

Dealers' Bulletin

Dealers' contracts for points in Eastern Nebraska, Kansas, Oklahoma, Colorado, Minnesota, the Dakotas, Northern Ohio, Eastern Pennsylvania, Delaware, Missouri, Alabama, Georgia, and Western New York cities. Would make contract for large distribution on Pacific Coast. You can get sale for scores of makes of pneumatics. You can sell only one make of Airless. See the point? The big Dayton Airless Season opens this spring.

Write us, advising how you are situated to handle the Dayton Airless Line

The Dayton Rubber Mfg. Co., 1005 Kiser St., Dayton, Ohio

1851 Broadway, NEW YORK CITY

2123 Michigan Avenue, CHICAGO

The Smaller the Car the More It Needs

GABRIEL SNUBBERS

\$15, \$20, \$25 per set of Four, Two Front and Two Rear. Half These Prices per Pair

Although Gabriel Snubbers are standard factory equipment on such cars as White, Stearns, Peerless, Oldsmobile, and Lozier, they are even more necessary on lighter cars.

That's because the shorter the wheelbase, the more abrupt and severe will be the jolts. The shorter and stiffer the springs, the more snappy will be their rebound.

To add Gabriel Snubbers is like lengthening the wheelbase and increasing the flexibility of the springs.

Think of the Riding Comfort, the Lessened Repair Expense and the Year or Two Extra Service

Booklet sent on request

Gabriel Horn Mfg. Company

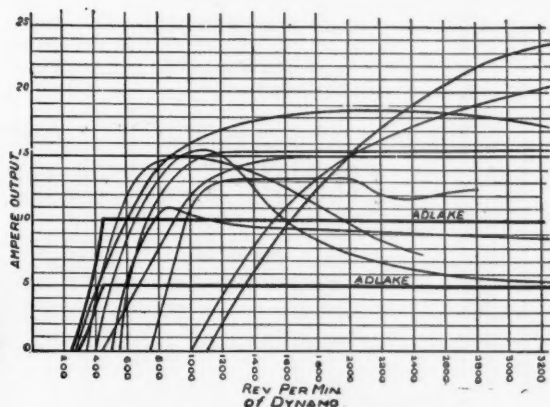
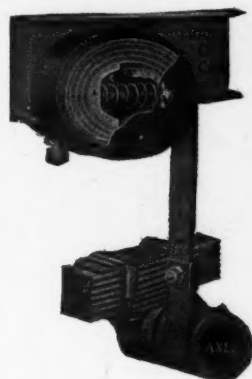
1415 E. 40th Street

Cleveland, Ohio

When the car springs compress, the belting is quickly drawn into the coil. On the instant the springs start to expand, friction within the coil retards paying out the belting. That prevents snappy rebound or excessive action of the springs—the two causes of jolts and jars.

When springs are at rest there is practically no "pull" on the belting. The rebound is checked solely by friction of the coils of belting upon a metal band between them.

Snubbers are as easy to attach as a pair of lamps. Nothing to work loose, rattle, wear out or require re-adjustment. Snubbers will outlast the car.



Established 1857

The Adams & Westlake Co.
317 West Ontario Street
Chicago

The curves on the left were plotted by a prominent user of the Adlake Automobile Lighting and Starting System in comparison with other systems.

LOWER CURVE—Touring Rate.

UPPER CURVE—Night or Winter Rate.

**The Curve
Speaks for Itself**

Low output at low speed means dead batteries

High output at high speed means burnt batteries

When Writing to Advertisers, Please Mention Motor Age.



It's just as unnecessary—just as extravagant—to throw away your tires when they become tread worn or rut worn as it is to throw away your shoes when the original sole becomes thin.

What French and German Motorists Are Doing

For over three years French and German motorists have been getting from 10,000 to 15,000 miles out of their tires, while American Motorists are getting from 3,000 to 5,000.

This difference represents each year from \$50.00 to \$200.00 in tire miles—and this is being carried away by the junk man.

"Half-sole" your tires with Durable Steel Studded Treads—just as European motorists are doing and you can double or treble their life.

Figure Out What This Means To You

The use of steel studded Treads is not confined to France and Germany, but is fast becoming universal throughout the entire continent of Europe.

In London and Berlin, as well as other European capitals, ordinances compel the use of steel studded Treads for public safety. They have solved the skidding problem for European Motorists.

In the past eight months 20,000 American and English motorists have "half-soled" their tires. During 1913 the sale of Durable Treads increased 917% in the United States alone and more than 40% of these sales were made through the recommendation of Durable Tread users.

The almost unbelievable waste in tires is an American extravagance.

It affects you—your pocketbook.

Just stop for a moment and consider what it would mean to you to get 10,000 or 15,000 miles out of your tires and at the same time drive your car without the constant nerve racking dread of tire trouble.

Guaranteed 5000 Miles Without a Puncture

Durable Steel Studded Treads are sold under a **signed guarantee for 5000 miles of wear without puncture.**

This is an iron-clad agreement—as good as a government bond—and holds good whether your tires are new or old, tread worn, rut worn or rim cut.

Special Discount Offer

To motorists in territories where Durable Treads have not as yet been introduced we offer a special introductory discount for advertising purposes—**equal to the full dealer's profit.**

Let us give you a demonstration at our own expense and risk—let us show you how to save from \$50.00 to \$200.00 a year on your tire bills.

Don't wait to write a letter. Tear out the coupon below—but **do it now** before you turn the page and forget.

Tear Out and Mail

The Colorado Tire & Leather Co.

1327 Acoma St., Denver, Colo. 1111 Karpen Bldg., Chicago.
450 Golden Gate Ave., San Francisco, Calif.

Gentlemen: I would like to know how European motorists are getting from 10,000 to 15,000 miles out of their tires.

Mail without expense or obligation to me, full information regarding Durable Treads. Also send samples and copy of written guarantee.

Name Address

City State My tire sizes are



The McAlpin Makes Your Stay in New York a Real Event

WHETHER your stay in New York be brief or protracted the Hotel McAlpin will make it memorable.

In the very heart of the theatre and shopping districts at Broadway and 34th Street—within one block of the Pennsylvania Terminal and a short walk from the Grand Central Station—with transportation to every point at its doors—and with a patronage of rare distinction, the McAlpin naturally appeals to everyone who appreciates the luxuries of metropolitan life.

Charges are so moderate as to be notable. Although the McAlpin is the largest and safest hotel in the world—with cuisine that cannot be excelled and exceptional service—yet your enjoyment of its conveniences is never marred by excessive rates. And here at the McAlpin is that happy combination—home-like comfort amid surroundings that are at once brilliant and in marked good taste.

Make it a point to stay at the McAlpin. The people you meet and the perfection of the appointments will make your visit a distinct event.

Management of MERRY & BOOMER

HOTEL McALPIN

Herald Square

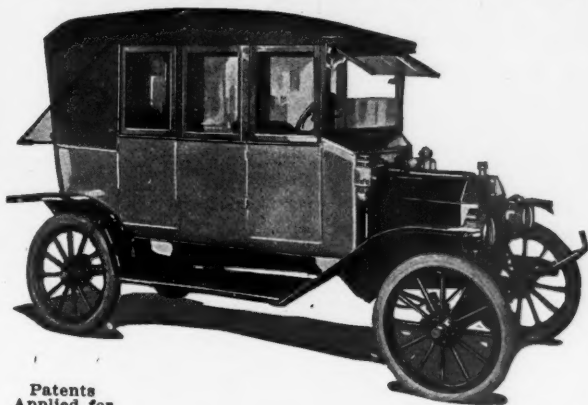
NEW YORK

Nearer than Anything to Everything



LEWKOWICZ

Give Pleasure Comfort Protection
CONVERTIBLE BODIES



Patents
Applied for

Converted
IN LESS THAN

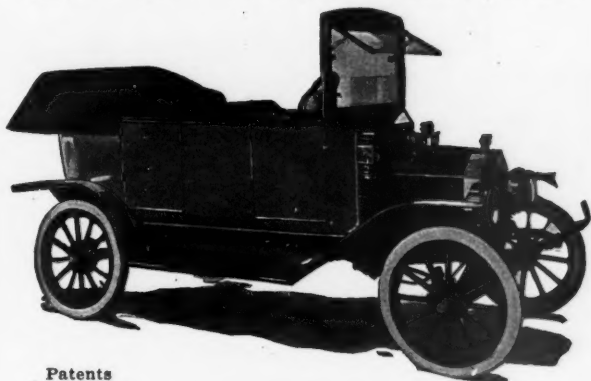
ONE MINUTE'S TIME

FROM A

Touring Car to a Closed Car

WITHOUT THE USE OF

Any Tools! Screws! Bolts! Pins!



Patents
Applied for

Manufactured for EVERY MAKE of CAR
FROM A

Ford to a Pierce Arrow

PRIVATE OWNERS---Write for particulars
on your cars!

AGENTS---Write for our agency proposition!

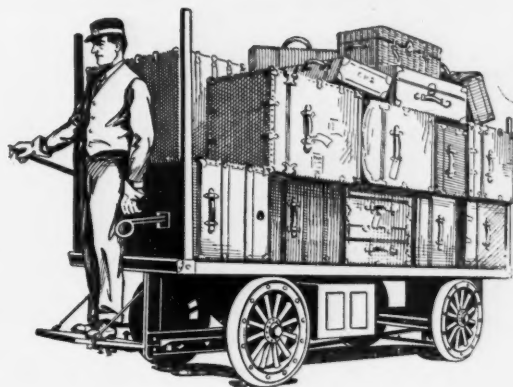
MANUFACTURERS---Write for license rights
for this wonderful invention which is a
necessity today!

**Convertible Automobile
Body Corporation**

OFFICE AND FACTORY:

1885 Park Ave., cor. 128th St., New York City

Phone 3478 Harlem



BAGGAGE on the station platforms
of the Pennsylvania Railroad and
Grand Central Terminals, New York
is handled on trucks driven by the

Gould
Storage Battery
Gould

WHAT better evidence could you
ask as to the reliability, high
capacity, long life and economy of
Gould Batteries for pleasure or
commercial vehicle propulsion?

You know what hard work baggage trucks
do at railroad stations in hauling 2000 to
4000-lb. loads, sometimes up grades as high
as 30 per cent. You know, too, that rail-
roads demand the very highest standard
of efficiency and have an eagle eye on
economy.

Equally profitable mileage per charge,
and the same service satisfaction, are ob-
tainable from any properly designed and
kept electric vehicle equipped with Gould
Batteries.

Ask us for information about our ex-
clusive process by which we produce bat-
tery plates of exceptional capacity and ex-
treme life.

Gould Battery renewals fit jars of any
make.

Gould Storage Battery Co.

GENERAL OFFICES: 30 EAST 42nd ST., NEW YORK

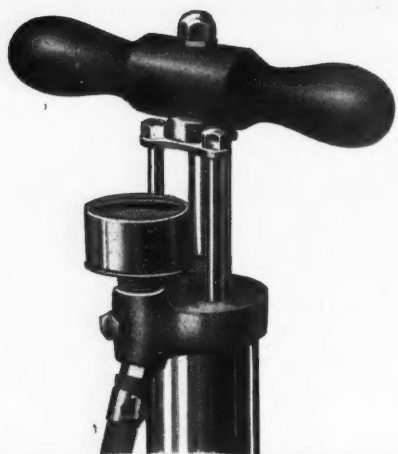
Boston: 14 Cambria St. Philadelphia: 613 Betz Bldg. Chi-
cago: The Rookery. Detroit: Boyer Building. Cleveland:
American Trust Building. San Francisco: 904 Rialto Building.

WORKS: Depew, New York.

Agents in: Washington, Kansas City, Denver, Topeka, Los
Angeles, Seattle. Canadian Representative,
E. E. T. Pringle: Toronto, Montreal, Winnipeg, Vancouver.

Full stock of parts, plates, and repairs carried by all
offices and agents.

(98)



Five Important Features of



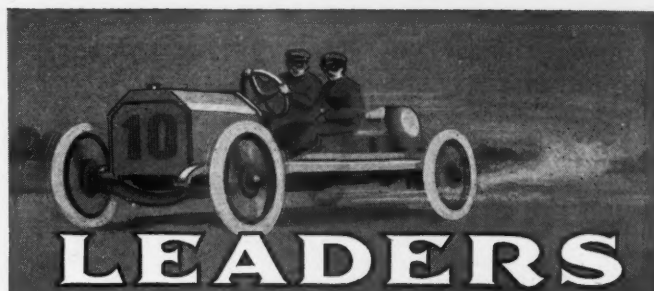
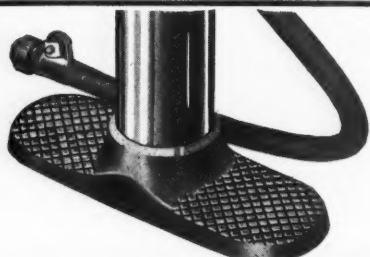
Tire Pumps

1. Easy to pump.
2. Will not rust because the pump cylinders are made of seamless brass tubing (not steel).
3. No dust or dirt can get into the tire.
4. Patent method of fastening pump cylinder to the foot base makes an absolutely non-leakable joint.
5. Simplicity of construction and careful workmanship insure unusual durability.

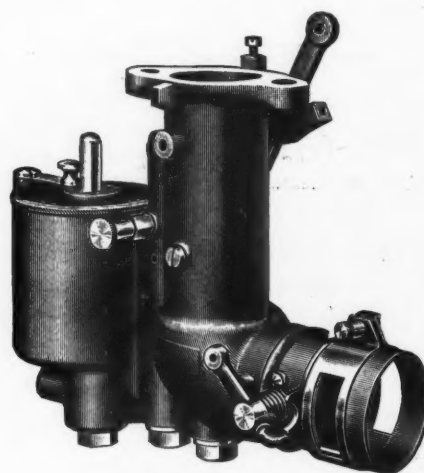
The "Stapley," which is a powerful compound pump, is the leader of the "Bridgeport" line. It is of the highest quality in construction and materials and is made to withstand hard usage. Price \$4.00 without gauge, \$6.00 with gauge.

The quality of all "Bridgeport" Pumps—"Stapley," "Aeolus," "Windjammer," etc.—backed by our extensive advertising in *The Saturday Evening Post* and motor publications, makes them the most popular in the market. It will pay you to carry and push them.

Bridgeport Brass Company
P. O. Box A Bridgeport, Conn.



In the automobile industry as in other lines of trade there is one device or article which, in its chosen field, leads all others in point of quality and wide-spread distribution. Such a leader is the Zenith carburetor—for six years the unchanging standard of the best known makes abroad.



Why it is a Leader

When Baverey invented the compound nozzle he solved the problem of efficient carburetion under all conditions with the simplest device for that purpose ever produced. The Zenith has no springs or valves or cams—no moving parts to trouble long suffering motorists. Just a rigid device, finely made, which far outlasts the life-span of a car.

The Motorist Should Know

The Zenith is used on more than 150 cars of Europe's famous list. Already nine American makes of prominence have adopted it. The Motorist should know the story of the Zenith and what it means for his pleasure and profit. Send for it.





IF

Your Automobile
is equipped with the
Pyrene
FIRE EXTINGUISHER

**You Can Secure
15% Reduction**
In Your Fire Insurance Premiums

Pyrene is the only effective extinguisher on highly inflammable fires, such as oil, gasoline, calcium carbide.

Pyrene will not freeze at fifty degrees F. below zero and is good until used, for it does not deteriorate, neither can it evaporate from the container.

Pyrene is non-damaging and non-corrosive. Pyrene Extinguisher is easily operated by man or woman and can be refilled as readily as a kerosene lamp.

NOTE—Pyrene brass and nickel-plated are the only type of fire extinguishers that qualify to obtain the 15% insurance reduction.

The Aetna Accident and Liability Co. and The Automobile Insurance Co. of Hartford, Conn., allow this reduction—See their agents or consult your own broker.

At all first-class auto supply dealers. Send postal to nearest branch for booklet—proving the service and true economy this scientific fire fighter brings to you.

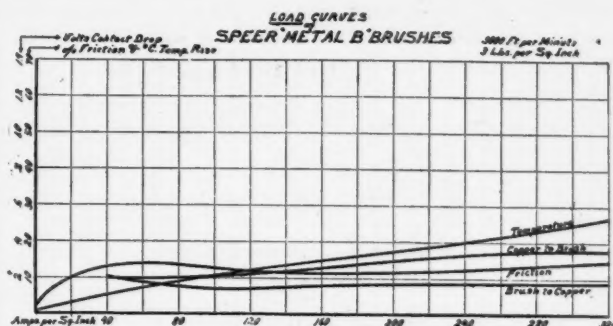
Brass and Nickel-Plated Fire Extinguishers are the only one-quarter Fire extinguishers included in the lists of approved Fire appliances issued by the National Board of Fire Underwriters.

Pyrene Manufacturing Co., 1358 Broadway, New York

Alton	Chicago	Louisville	Philadelphia
Anderson, S. C.	Cincinnati	Memphis	Pittsburgh
Atlanta	Cleveland	Milwaukee	Richmond
Baltimore	Dayton	New Orleans	St. Louis
Birmingham	Denver	Norfolk	St. Paul
Bridgeport	Detroit	Oklahoma	Salt Lake City
Boston	Duluth	City	San Antonio
Buffalo	Jacksonville	Phoenix	York, Neb.

Pacific Coast Distributors: Gorham Fire Apparatus Co., Seattle
San Francisco Los Angeles

Distributors for Great Britain and the Continent:
The Pyrene Co., Ltd., 29A Charing Cross Road, London, W. C.



SPEER METAL BRUSHES

For
**Automobile Lighting
and
Starting Systems**

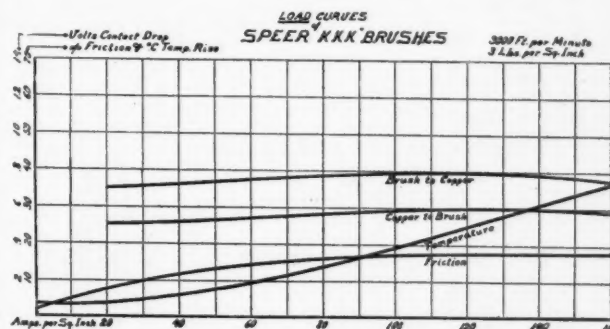
A new type brush of proved superiority which has been adopted by the largest makers of Starting Systems in the country, for use on their entire product.

Grade B for use on 6-volt machines.

Grade KKKK on 10 to 20-volt type.

Grade KKK for voltage of from 20 to 40.

They are absolutely superior to any brush on the market for use on starting systems, etc. Load curves show co-efficient of friction contact drop and temperature rise.



We are equipped to handle any size or any number of orders and give prompt delivery. Many contracts have been closed with prominent concerns after thorough investigation. Write for complete data and price.

SPEER CARBON CO.
ST. MARY'S PA.

This SPRING, GINGER UP YOUR MOTOR WITH



Start the motoring season *right!* Don't put up with a "feeble" motor this year as you did last. A motor that won't climb hills, that loses its "drive" in the sand and mud, nine times in ten is troubled with old style leaky piston rings which won't hold compression.

It is mechanically impossible for STA-TITE Piston Rings to lose compression. Put a set of STA-TITE Rings on a motor troubled with faulty compression and we'll *guarantee* them to increase power, decrease fuel consumption and minimize carbonization.

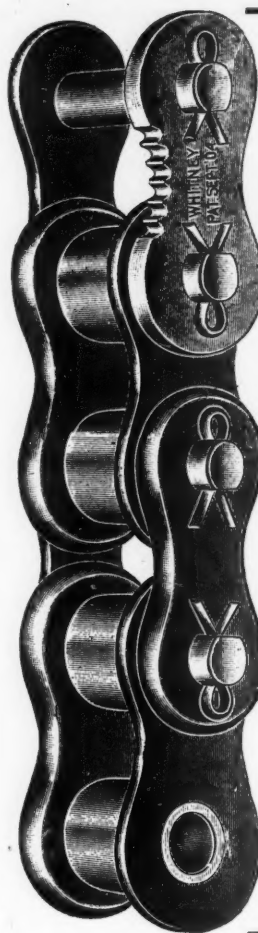
STA-TITE Rings enable a motor to develop its *full* rated horsepower—one reason for your telling your garageman to install a set this spring when you overhaul.

STA-TITE Rings are made in three pieces. All joints automatically seal when the ring is placed on the piston. Adapted to autos, motor boats, etc. Made of special processed gray iron. Can be attached to any piston head.

Money refunded if not satisfied.

LIBERAL TERMS TO SUPPLY HOUSES AND REPAIR SHOPS
WRITE FOR LITERATURE.

STA-TITE PACKING RING COMPANY
3034 Olive Street, St. Louis, Mo.



"Whitney" Chains

Are used by the Leaders

They have been the recognized leaders for years and are the most practical chains built for commercial vehicles.

We have completed a large addition to our factory, making it the most modern and complete factory of its kind in the country, and are now in position to fill orders promptly.

Insist on "Whitney" Chains when making replacements.

**"Whitney" Chains
Are Built for Strains**

The Whitney Mfg. Co.
Hartford, Conn.



V-Ray Spark Plugs

Possess a superiority that has never been questioned; cannot be injured by heat or oil

Sold with a Guarantee

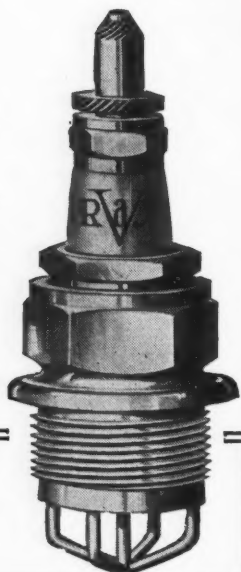
V-Ray

Porcelain
SPARK PLUG
\$1.00

"Mika"
SPARK PLUG
\$1.25

For Sale by
ALL JOBBERS
ALL DEALERS

**The
V-Ray Company**
MARSHALLTOWN, IOWA



**Give More Power
on Less Gas**



Trailer being backed around right angle corner, guided by man at draw bar.

Troy Reversible Trailers follow the truck around any corner or into any opening. They can be backed in a straight line or around a corner and spotted any place.

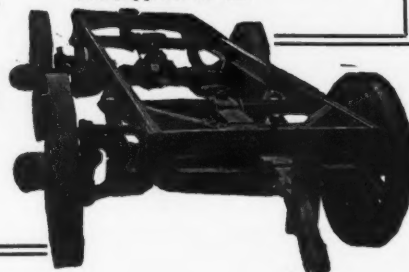
On short or long hauls, you can greatly increase the efficiency of your truck with the Troy Trailer.

Send for Bulletin M
and the price

**The Troy Wagon
Works Company**
Clay Street
TROY, MIAMI CO.
OHIO



This shows trailer in under gravel bin. Note how narrow this space is and how near center truck is placed. There is only about two inches space between truck sides and supports of bin.





EDISON MAZDA LAMP Service Stations

"Service" is behind the EDISON Lamp. Service in operation and service in obtaining the lamps.

For the convenience of car owners EDISON MAZDA Automobile Lamp Supply Stations are now established all over the country. At these Supply Stations the motorist may obtain renewals—the right kind of lamp that will give the most efficient and satisfactory service with the lighting system on the car.

EDISON MAZDA *Automobile Lamps*

may be obtained wherever an EDISON MAZDA service station or agency sign is seen. It is the progressive dealer, supply house or garage that displays this sign. Right there you will obtain other standardized accessories that will give you maximum service and satisfaction. Nearly every car owner when putting in new bulbs insists on EDISON MAZDAS. They are backed by MAZDA Service.

Ask for what you want by name. "Be sure the lamps you buy bear the name EDISON."

EDISON LAMP WORKS
OF GENERAL ELECTRIC COMPANY
General Sales Office Harrison, New Jersey.



4584

MAKE \$250.00 A MONTH Repairing AUTO Tires

Sounds like a lot of money
—IT IS—A WHOLE
LOT of MONEY to be earning
CLEAR every month—yet it's
what hundreds of men we have established in the Automobile Tire Repair Business are making. You let down the DRAW BRIDGE for SUCCESS to enter into your career by getting into business for yourself. The business for you is the one where investment is small—the returns quick and for cash—where the margin of profit is large—the demand for your PRODUCT or SERVICE constant and ever on the increase.

A HAYWOOD TIRE REPAIR EQUIPMENT

answers to all of these requirements of Old Dame Fortune—The certainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

Here Is Your Opportunity!

Be first to enter this new big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnson, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

Repair Tires At Home

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business.

Auto Owners—Repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

The New Money-Making Business
—Start Now—This Man is Making Money

Business Keeps Coming



Haywood Tire & Equipment Co.
720 N. Capital Ave., Indianapolis, Ind.



The Apple Electric Company
67 Canal Street Dayton, Ohio

America's Leading Manufacturer of

Electrical Equipment

for

Motor Cars

Motor Trucks

and

Motor Boats

Electric Engine Starters
Electric Lighting Outfits
(for Motor Cars)

Electric Engine Starters
Electric Lighting Outfits
(for Motor Boats)

The Famous Apelco Storage Batteries
Electric House Lighting Plants

WRITE FOR BULLETINS

The Apple Electric Company
67 Canal Street, Dayton, Ohio



"Keep On Going. Bill. I'm Coming All Right"

Worry about "getting home" doesn't bother the man whose car carries a Basline Autowline. Skidding, engine friskiness or tire troubles won't leave him stalled for long. He's ready to take a tow, or give one, any time. Autowline is about 25 feet of 1/4 inch steel wire rope, same name and quality as famous Yellow Strand rope that helped dig Uncle Sam's big Panama ditch.

Basline Autowline

"The Little Steel Rope with the Big Pull"

weighs but 4 1/2 pounds. Coils under cushion or stows away anywhere. Pulls a 4000-lb. car up a 20% grade. If a tree or pole is handy to hitch to, Autowline will pull a car out of hole or rut on its own power.

All accessory dealers handle Basline Autowline. Price, east of Rocky Mountains, \$3.95. Get one and be ready for what's coming.

FREE Illustrated Autowline circular. Write for it



Broderick & Bascom Rope Co.

813 N. Second Street St. Louis, Mo.

New York Office, 76 E. Warren St.

Manufacturers of famous Yellow Strand Wire Rope, the rope with one yellow strand but no yellow streak

Space contributed by MOTOR AGE.

\$5 Sent to Emory W. Clark up in Detroit makes you a Life Member of



The Anti-Pikers Association of America

One of these days you are going to get up, look the old boat over, and say: "Well, wife, let's start for Market Street" or "Let's drive to Broadway."

Not a bit ridiculous!

When they get that LINCOLN HIGHWAY finished you can do that very thing. It will be a joy to ride over it.

It's no pipe dream! It's a positive plan. It will be done!

Builders of motor cars and tire and other manufacturers have contributed millions. Cement makers have followed suit. Now we fellows with the cars should come across with our five spots or MORE.

We get in on the ground floor but we get in EASIER. Europe can't touch a tour over this Highway from Broadway to Market Street when it comes to REAL NATURE THRILLS, smooth going, wonderful scenery and OZONE that will put leather lungs in everybody.

THERE'S YOUR CHECKBOOK. You've got the manhood, the pen and the ink. DO IT NOW! They're waiting for you to sign. Pin this coupon to your check.

I am a regular motorist.

My name is

My address is

Herewith I contribute \$.....

Send me a contributor's certificate, membership card and radiator emblem.

The Lincoln Highway Association

Detroit, Mich.



Casting Weighing 1600 lbs. Worth \$180.00

MONARCH

system of Ox-Acetylene Welding and Carbon Removing for

"GARAGES," Manufacturers, Contractors, Machine-Shops, Foundries, Steel-mills, Railroad-shops, Street Railways, etc.

In making broken parts good as new, and simplifying manufacture, The "MONARCH" system has worked wonders.

GARAGES use this machine for Welding, Brazing, Straightening, Soldering, Removing Carbon, etc.

Automobiles and other factories use the MONARCH system for Reclaiming defective castings, Filling

up misplaced holes, Adding bosses, etc.

Weld Castings.

Braze Buggy tire wires instantly.

Weld split pipes.

Correct mistakes in design.

Weld and straighten frames.

Bond steel rails at 1/10 the cost in 1/10 the time.

Boller Shops—Make boilers and tanks any size, any gauge for any pressure, without a rivet. They look better, cost less and are stronger.

Also weld cracks from and between rivets, cracked tube plate bridges, broken mud rings, door frames, etc.

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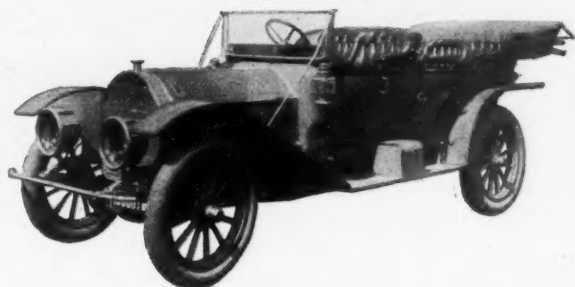
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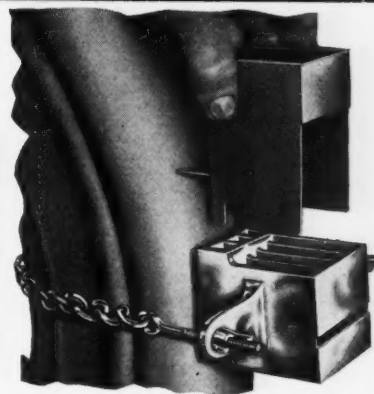
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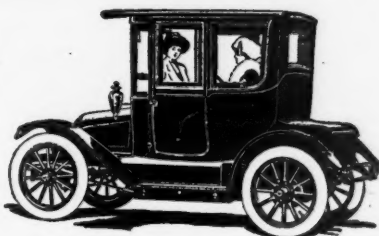
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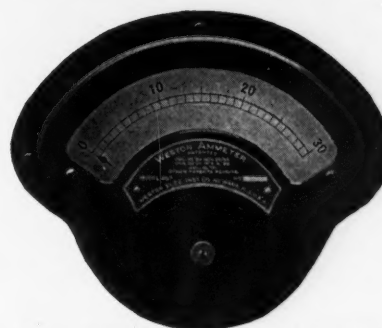
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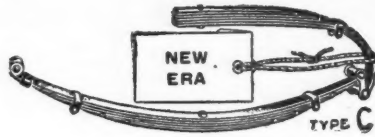
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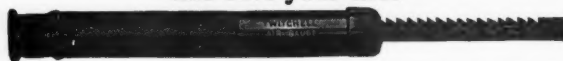
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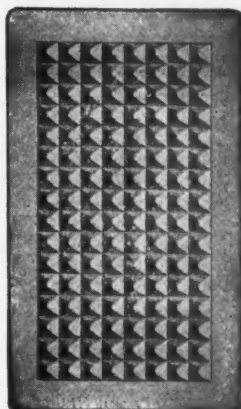
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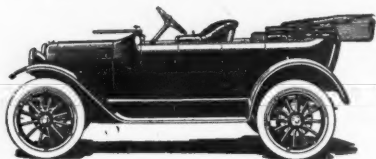
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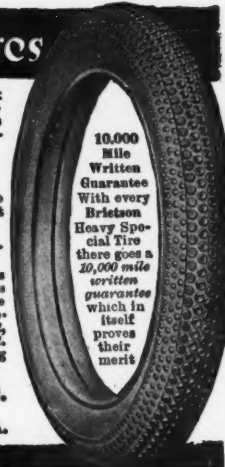
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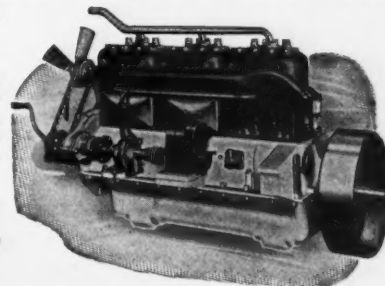
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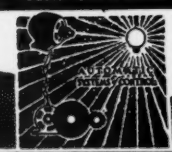
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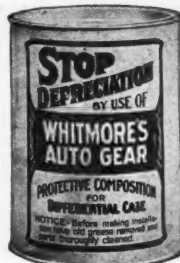
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By
E. W. LONGNECKER

Twelve years' constant experience with Hydro-Carbon Engines. How to start, how to operate, and how to care for all classes of explosive motors or engines using gas, gasoline or similar fuels. A full and exhaustive chapter on electric and other systems of igniting. Every line tells something. Every page full of interest. A book of 172 pages, neatly bound in cloth. Sent postpaid on receipt of price, \$1.00.

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TOURING CAR \$850
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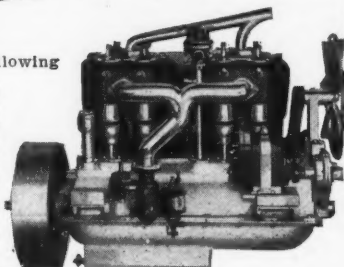
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Use this "TOUGHEST STUFF" and eliminate the Breakages you are now having

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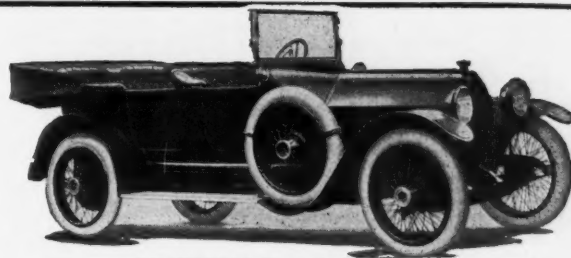
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Continental 6 P motor, 48 H. P. Bosch Ignition. Brown-Lipe 4 speed forward transmission. Spicer Universal joints. Timken full floating rear axle. Timken front axle with Empico speedometer drive. Timken bearings throughout. Long radiator. One man top. Gemmer steering gear. Left drive, center control. Goodrich tires, 34 x 4 1/2. Electric starting, generating and lighting. 130-inch wheelbase. 3,600 lbs.

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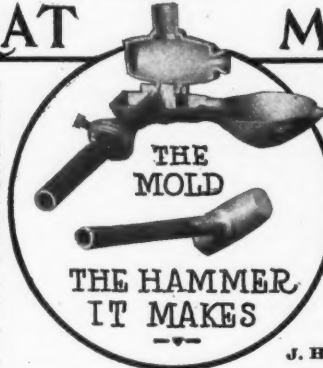
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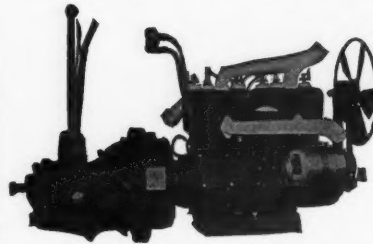
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Anyone can use this mold. Made in 4 sizes, for Nos. 2, 3, 4 & 5 hammers. Prices for mold and ladle, including 1 hammer handle: No. 2, 2-lb., \$1.20; No. 3, 3-lb., \$1.30; No. 4, 4-lb., \$1.40; No. 5, 5-lb., \$1.50. At all dealers or direct on receipt of price. Address Dept. D. J. HORAT, Manufacturer Lafayette, Ind.

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We beg to announce our latest four cylinder Unit Power Plant. This Motor includes the recognized engineering practice, here and abroad. "Craftsmanship of long experience is the result of this distinctive Power Plant." Detailed information on request, and we are in a position to make prompt deliveries according to contract.

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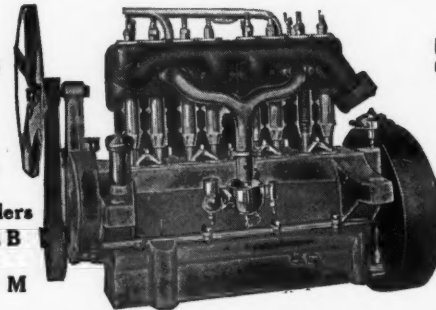


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Two "sixes" and a "four." Roadsters, touring and enclosed body cars.

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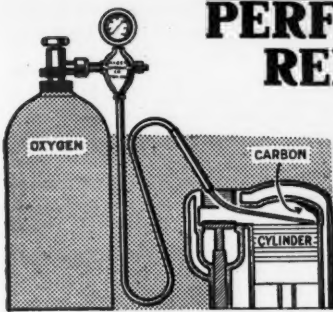
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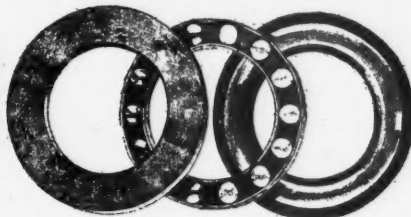
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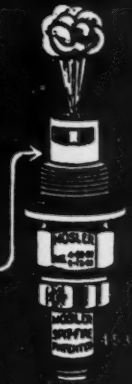
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It bears the stamp of approval of
America's best car manufacturers.

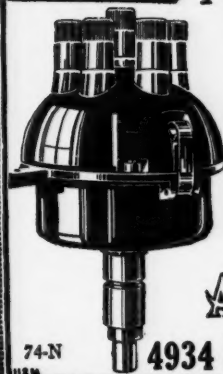
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The
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For every kind and make of motor. A system ideal in efficiency, simplicity, and reliability.

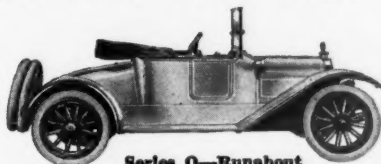
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A runabout for the man who demands more in power, speed and comfortable riding qualities than the smaller type of two-passenger car can give.

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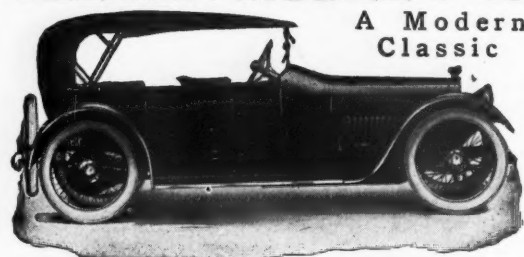
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BUILD YOUR OWN CAR

Pressed steel frame.....	\$ 4.00
Shaft drive axles, per pair.....	50.00
Wood wheels with Q. D. clincher rims, per set	12.00
Springs, per set of four.....	8.00
Locking steering devices.....	10.00
Sliding gear transmissions.....	35.00
5-passenger body	10.00
4-cylinder motor	75.00

SEND FOR OUR BARGAIN SHEET

AUTO PARTS CO.,
737-739 Jackson Blvd.,
CHICAGO.

CHAUFFEURS MEMO PAD, EASILY AT-
tached to steering wheel, special price, 30c.
Adjustable Accelerator Heel Rest, \$1.50.
Orders filled promptly. H. C. Rich, 316 W.
44th St., New York.

COMMERCIAL BODIES FOR FORD CARS.
Seat covers for all cars.
Write for full particulars.
AUTO CAPE TOP CO.,
2334 Michigan Ave., Chicago, Ill.

CUT-OUTS.
E.M.F. Flanders, Buick, Regal, etc. Com-
plete outfit, with brass lock open pedal, \$1.50.
Lincoln Machine Shop, Lincoln, Ill.

DETROIT ATTACHABLE FORE DOORS.
For E.M.F., Ford, Hudson, etc. One-piece
aluminum. Easy to put on.
DETROIT FORE DOOR CO.
66 E. Ford St., Detroit.

DIRECT FACTORY SALE

THE WARREN MOTOR CAR COMPANY

are closing out all surplus stock of new
auto parts at prices that demand quick sale:

\$ 1.00 spark plugs.....	\$.19
150.00 full floating rear axle.....	50.00
30.00 front axles.....	12.50
50.00 pressed steel frame—all sizes.....	10.00
100.00 auto bodies.....	30.00
60.00 radiator—many sizes and styles.....	15.00
100.00 magnetos.....	35.00
8.00 iron vises.....	3.19
15.00 electric horns.....	3.98
5.00 complete tool kits.....	1.09
50.00 steering gears.....	12.19
10.00 gasoline tanks—square.....	1.00
18.00 oval and round tanks.....	3.00

Anything else? We have it. Send for a
Big Bargain list of new goods being sold at
this sale. Get on our mailing list.

Hundreds of other automobile parts and
accessories are shown on our Big Bargain
Sheet of goods sold at this sale.

Write for this quick.

WARREN MOTOR CAR CO.

51 Tenth St., Detroit, Mich.

DOLLAR SAVING AUTO SUPPLY BOOK
FREE

Reduce auto upkeep cost practically one-
third by purchasing standard auto supplies
through our new free Catalog. Justice Auto
Casings and Tubes, standard construction
throughout, at prices 25 per cent lower than
others. We guarantee satisfactory service
from them. Mail us a postal requesting
Auto Supply Catalog No. 72M80.

SEARS, ROEBUCK AND CO.,
Chicago, Ill.

EXTRA—FORD OWNERS—CATALOG!
Now ready—FREE 1914 Spring Ford (up-
keep reducing) Catalog. New stock of Ford
size tires. All guaranteed makes, at cut
prices. Write at once.
CONSUMERS AUTO SUPPLY CO.,
123 W. Madison St., Chicago.

FIX UP YOUR AUTOMOBILE WITH BOY-
er's Air Drying, Glossy Refinisher and
Color Finishes—all colors. Write us condi-
tion of your car. Boyer Laboratory Com-
pany, State and Michigan Sts., Chicago.

FORD ACCESSORIES.

Ford fancy cast brass hub caps, which will
not dent. Also fancy radiator caps. We
make rain-vision hinges that can be at-
tached to your shield. Write today.
ILLINOIS BRASS MFG. CO.,
11 S. Desplaines St., Chicago.

FORD AGENTS AND ACCESSORIES
dealers. Write for our Ford Specialty
Catalog and best jobbers' discounts. Every-
thing for the Ford. The Browne Supply Co.,
126 Erie St., Toledo, Ohio.

FORD AND AUTO OWNERS

Catalog JUST OFF THE PRESS Catalog

Send for a copy of our
latest 1914 illustrated
Cut-Price Catalogue.

LIBERTY TIRE CO.,
102 Chambers St.,
New York City

FORD AUTOMOBILE SPECIALTIES.

Look for the APCO on the box. If you see
this trade mark, you are safe in every way,
for it means "Every sale a sale of satisfac-
tion." Your money will be cheerfully re-
funded if you are at all dissatisfied. The
APCO goods cost you no more, so insist
and don't let your dealer sell you "some-
thing just as good" and on which all sales
are final. He makes more money, but
where do you get off? Remember if your
dealer won't refund your money, we will.
You buy APCO and let the other fellow get
the imitation. Sold the World Over.
AUTO PARTS CO., PROVIDENCE, R. I.
The originators and largest manufacturers
of Ford Specialties in the world.

FORD DEALERS

Get our catalogue on commercial bodies for
the Ford car.

F. E. Lortz Co.,
Chicago, U. S. A.

FORD DEALERS, GET OUR AGENCY FOR
Ford Spare Wheels. All wheels inter-
changeable. "Angler's," Streator, Ill.

FORD HONEYCOMB RADIATORS.

This radiator will properly cool any Ford
motor and make your Ford a better car.
Get our dealers' proposition. Price, \$25.00
f. o. b. Detroit.
DETROIT RADIATOR & SPECIALTY CO.,
965 Woodward Ave., Detroit.

FORD OWNERS AND DEALERS!

You will save trouble and money by in-
stalling our timer elevating device.
Ford Parts Specialty Co.,
1211 Main St., Richmond, Ind.

FORD OWNERS AND DEALERS—THE
TOWNSAN VALVE ADJUSTER AND
SILENCER will silence your valves. You
can adjust them quickly. Most all jobbers
or address Townsan Auto Spec. Co., Mitchell,
S. D.

FORD OWNERS, "LISTEN!"

Write us for commercial and racing bodies.
Bucket seats, linoleum covered running
boards, and glass tops.

AUTO REMODELING CO.,
1501-5 Michigan Ave., Chicago, Ill.

FORD OWNERS, OUR GASOLINE GAUGE
tells exactly the amount of gas in your
tank. Prepaid for 15c in stamps.
The Browne Supply Co., Toledo, O.

FORD OWNERS — PURDY EXHAUST
horn for Fords is being used everywhere—
positively will not clog or choke. Write to-
day for catalogue. DEALERS ask for
prices.
Purdy Bros. Co., 49 E. 55th St., Chicago.

FORD, HUPP AND MAXWELL

Muffler cut-out, machined ready to attach,
including lock open pedal string and cables.
\$1.35. Lincoln Machine Shop, Lincoln, Ill. o

FORD OWNERS, OUR PURE WHITE FELT
washers for Ford rear axles, stop grease
leak. 20c set four, prepaid. Angler's,
Streator, Ill.

FORD—RACING—FORD

Write us for racing bodies.
AUTO REMODELING CO.,
1501-5 Michigan Ave., Chicago, Ill.

FORD SEAT COVERS MADE OF DOUBLE
texture waterproof cloth, edges leather
bound. Cover all upholstery and doors. Price,
including top hood, roadster \$11.00; touring
car \$18.00. Postpaid.
Truscott Auto Supply Co., St. Joseph, Mich.

FORD OWNERS—WE CAN MAKE YOUR
car the easiest rider made with light or
heavy load; no jolt, no jars, no upthrow.
Write us. Automobile Machine Co., Canis-
teo, N. Y.

FORD ROADSTER BODY, COMPLETE
with top, cushion and side curtains, \$35.00.
Dealers only.

MACINNIS BROS.,
Toledo, Ohio.

FOR SALE—A FIVE PASSENGER TOUR-
ing car body with new mohair top, side
curtains and slip cover, all in guaranteed
condition, cheap to quick buyer. Address
Terwilliger, Port Jervis, N. Y.

FOR SALE AT A BARGAIN. NEW 5x6
four-cylinder, governor controlled engine,
fully equipped with carburetor, magneto.
Will sell for much less than cost. Fred
Hanson, 570 Prior Ave., St. Paul, Minn.

FOR SALE—MILLER VULCANIZING
Plant complete with kettle, section molds,
tube press, inside curing molds, six H. P.
boiler and other equipment. Price \$225.00
f. o. b. Decatur, Ill. North Main St. Garage,
Decatur, Ill.

FOR SALE—NEW 1914 TOP AND BODY
(never used) for

FORD MODEL T
runabout. This includes curtains, top-hood
and cushions, all new. Price reasonable.
Peebles Motor Car Co., 129 W. Main St.,
Wilmington, Ohio.

FOR SALE—ONE 5 H. P. WESTINGHOUSE
motor, single phase, for either 110 or 220
A. C. This motor is in first class condition.
Used only six months. Reasons for selling,
now have our own plant on D. C. Price,
\$120.00, f. o. b. Quincy, Ill.
J. C. Nichols Motor Car Co., Quincy, Ill.

FORD T. OWNERS.

Foot throttle or accelerators, \$1.50. Lin-
coln Machine Shop, Lincoln, Ill.

FORE-DOORS AT CUT PRICES

Mr. Auto Owner and Dealer: If your car is
without fore-doors, write today for bargain
prices; to reduce stock.

DEPT. D., AUTO SPECIALTY MFG. CO.

326-30 E. Market St.
Indianapolis, Ind.

FORE DOOR BODIES

1914 Models, five-passenger, fully uphol-
stered; fit most any car. Cost, \$350.00; our
price, while they last, \$85.00. Write for full
description.

The M. & M. Company,
480-500 Prospect Ave.,
Cleveland, Ohio.

FORE DOORS FOR ALL OLD MODELS—
Prices right. F. E. Lortz Co., 1332 Michi-
gan Ave., Chicago.

FOUR CYLINDER BUDA MOTORS, \$165.
Send for Our Bargain Sheet.

AUTO PARTS CO.,
737-739 Jackson Blvd.,
CHICAGO.

GET WHAT YOU PAY FOR

Our Hydrometer tells you exactly what
grade gasoline you are getting. Sent pre-
paid, complete with glass jar and case for
One Dollar. 25,000 sold this year. Send for
yours today.

MARSHALL, WALTER & CO.,
Milwaukee, Wisconsin.

GET OUR PLAN FOR MONOGRAMMING
automobiles and motorcycles by special
transfer method. MOTORISTS' ACCESS-
ORIES CO., Ashland, Ohio.

GRIND YOUR OWN CYLINDERS IN YOUR
own shop. Save money. Make money.
Perfect work. Lowest cost. No rotating of
cylinders required on the Acme Grinder.
Particulars on request.
ACME GRINDER COMPANY,
2740 Humboldt Ave., So. Minneapolis, Minn.

LEVENE MOTOR CO.,
Sole manufacturers and distributors of
repair parts for
LION MOTOR PARTS CO.
LOUIS J. BERGDOLL MOTOR CO.
MIDLAND MOTOR CO.

We have purchased the entire stock of parts, jigs, patterns, drawings, etc., of the above mentioned companies, and are prepared to fill orders for repair parts for all models of these cars; give name and number of cars when ordering parts. Price list on application.

LEVENE MOTOR CO.,
2200-2218 Diamond St., Philadelphia, Pa.

LIGHT YOUR CAR CHEAP

Apple Lighting Generator, new, complete\$30.00

SEND FOR OUR BARGAIN SHEET

AUTO PARTS CO.,
737-739 Jackson Blvd.,
CHICAGO.

MAGNETOS—WE HAVE 2,000 MODEL X
Splitdorf Magnets; new price, without coil, \$17.50 each; with coil, \$25.00 each.
The regular price of these is \$75.00.

We also have other makes of magnets at cut prices—in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money saver in the world.

TIMES SQUARE AUTO CO.,
1210 Michigan Blvd., Chicago, Ill.
S. W. cor 56th St. & Broadway, N. Y. City.

MIGHTY MICHIGAN 40

We have all parts to build or repair the Michigan car. Do not order repair parts until you have sent for our list.

AUTO PARTS CO.,
737-739 W. Jackson Blvd.,
CHICAGO.

MICHIGAN, MORA AND DRAGON PARTS.

We have maintained the exclusive repair parts business of the Dragon Car since 1907 and on the Mora Car since 1910. We recently purchased the bulk of the stock and all repair parts of the Michigan Cars necessary to maintain the best service in this car also.

This stock together with our unexcelled machine shop equipment should afford Michigan car owners better service than the makers of the car could give. Our revised price list is now ready for distribution, same will be furnished on application, giving model, style and year of car.

PHILADELPHIA MACHINE WORKS,
61-71 Laurel Street, Philadelphia, Pa.

PEERLESS LAMP ENAMEL

A black enameled lamp with one coat. Not affected by heat or cold. Does not crack, chip or peel. Made in either a Gloss or Dull Finish. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

MIDLAND AUTOMOBILE PARTS

We have purchased a great quantity of the parts for the Midland car and can furnish you the outfit in parts complete or repair parts cheaper than any one else. Send for our list.

AUTO PARTS CO.,
737-739 Jackson Blvd.,
CHICAGO.

MOTOR OWNERS, ATTENTION!

National Oxygen Carbon Remover, fully guaranteed, \$10.00. Don't buy unnecessary attachments; we will let you try this machine thirty days. National Sales Company, 210 Midland Building, Kansas City, Mo.

PEERLESS MOHAIR TOP DRESSING

Waterproofs leaking tops and makes old tops like new. Sold by garages, dealers and jobbers.

THE COLUMBUS VARNISH CO.,
Columbus, O.

NEW FOUR CYLINDER AUTOMOBILE
and 2 cylinder stationary engines. We solicit all kinds of machine work and guarantee satisfaction.

ALFORD MOTOR & MACHINE CO.,
Goshen, Ind.

PEERLESS LINING DYE

Makes all faded, stained and spotted linings a black uniform color. Makes old linings like new. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

PAINT YOUR CAR YOURSELF.

Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

ARSENAL VARNISH COMPANY,
Auto Dept., Rock Island, Ill.

PEERLESS LEATHER TOP DRESSING

A preserver for all rubber, leather and pantasote tops and curtains. Makes old tops like new. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

PARTS FOR FORD CARS

Wire wheels, 1er set four.....	\$22.50
Artillery type wood wheels, demountable, with 5 rims, set.....	22.50
Mezger Ford windshields.....	5.00
Wheel pullers.....	.75
Anti-rattling ball sockets.....	.75
Cut Out Pedal Assembly.....	1.00
Fan Belts.....	.30
Radiator caps with Tee handle.....	.40
Complete set of gaskets.....	.50
Complete set of seat covers, touring car	11.00
Roadster.....	8.00
Hilo magneto horn for Ford.....	3.50
Clamp-on Bumper.....	3.00
Briggs & Stratton Master Vibrator for Ford.....	6.00
K-W Master Vibrator.....	12.00
Rushmore Brass Generators for Ford..	3.00
Melody horn outfit for Ford.....	2.75
Victor Whistle outfit for Ford complete	5.50
Mosler Breach Block Priming Cup	
Spark Plugs for Ford.....	1.00
Ford Radiators.....	17.00

SEND FOR OUR BARGAIN SHEET

AUTO PARTS CO.,
737-739 Jackson Blvd.,
CHICAGO.

PEERLESS CUSHION DRESSING

Brightens and renews all leather seats and cushions. Will not wash or rub off. Dries in twenty minutes. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

PUMP HOSE, BEST GRADE. JOB LOT OF
short lengths, 2c per ft. Brake band lining, all sizes and thicknesses, radiator hose, two and three ply. Short lengths at half regular dealers' prices. Pennant holders, 10c each. Write for list, save 50% on the above accessories.

AUTOMOBILE SUPPLY CO.,
Burlington, Wisconsin.

REPAIR MEN — REMAGNETIZE YOUR
own magnetos with latest and best electro-magnet coil, operated from dry-cell batteries, sold under an absolute guarantee. Price \$15.00.

WILLIAMS ELECTRICAL CO.,
1515 Harrington Ave., North Fort Worth, Texas.

RACING CHASSIS FOR SALE—JUST
overhauled; very fast; five-speed transmission; \$510. Write for specifications. Hugh F. Hunter, Owensboro, Ky.

RADIATORS

SMASHED, FROZEN OR INEFFICIENT?
Write **WRIGHT RADIATOR MFG. CO.,** and have a better one shipped to you the same day order is received. The only radiator manufacturers who carry in stock hundreds of radiators, all of their own make and guaranteed to be the equal of any radiator made.

WRIGHT RADIATOR MFG. CO.,
8th St., Muskegon, Mich.

RADIATORS.

NEW.	NEW.
Ford T	\$17.00
Buick F, 16, 17, 19, 26, 27, 28.....	30.00
Buick 10, 14, 32, 33.....	22.00
Hudson 20	28.00
Hupp 1910-1911	27.00
Overland	30.00

All other makes at equally low prices. Send us your old radiator for repairs or exchange on a new one.

TIMES SQUARE AUTO CO.,

1210 Michigan Ave., Chicago, Ills.
56th & Broadway, New York City.

RADIATORS.

"Put up a good front" by putting on our genuine guaranteed cellular radiators (commonly called Honeycomb).

Ford T	\$25.00
Buick 10-24-25-34-35-36.....	27.50
Buick 16-17-19-26-27-28.....	35.00
Buick 21-38-39-43.....	37.50

Equally attractive price on all popular models. Every one a new, complete radiator. Five per cent discount allowed for cash with order.

DETROIT RADIATOR & SPECIALTY CO.,

963 Woodward Ave., Detroit, Mich.

REAL BARGAINS FOR PROMPT DELIVERY

40-foot Prest-O-Lite gas tanks, new, filled, complete, worth \$25, for \$13.
Motorcycle size, worth \$10, for \$7.70.
Lighter and patent burner cleaner free with each order.

CUT PRICE GAS TANK SALES CO.,
198 W. Water St., Milwaukee, Wis.

REMOVED TO NEW AND LARGER QUARTERS

Splitdorf 4 cylinder magnetos, models T and D.....	\$20.00
Schebler carburetor, model L, used but in perfect condition.....	6.50
4 speed transmissions, new, Warner..	70.00
Buick model 17 radiators, new.....	30.00
34x4 Fisk casings and tubes, used but good for 3,000 miles.....	14.00

Send for list of other bargains

AUTOMOBILE APPLIANCE CO.

1436-38 Michigan Ave.,
Chicago, Ill.

RECTIFIERS TO CHARGE FROM A-C
circuit 1 to 8 ignition, lighting or starting
batteries at one time; \$12 & upwards. Amer-
ican Battery Co., 1124 Fulton St., Chicago.

"SAFETY FIRST."

Most accidents are caused by "cloudy"
glass fronts. Our patented glass front
cleaner removes rain, snow and "breath-
steam" from windshields instantly. Made of
brass; cannot rattle; always ready; operates
from driver's seat. Send two dollar bill for
one today and be safe. Tomorrow you might
have accident costing two thousand, maybe
life. MARSHALL, WALTER & CO., Mil-
waukee, Wisconsin.

"SAVE YOUR GASOLINE."

We have 150 Rayfield carburetors, regular
\$20.00 kind. Our price \$8.20 while they last.
PURITAN MACHINE CO.,
415 Lafayette Blvd., Detroit, Mich.

SCHLEBLER MODEL "L" CARBURETORS,
new 1½-inch, \$8.00 each. Order early.
Kent Motor Car Co., Kenosha, Wis.

SEAT COVERS

Ford, Overland, Studebaker owners, send
for our money-saving prices and samples of
our materials.

GLOBE SEAT COVER CO.,
Dept. M., Racine, Wis.

SHINAUTO—THE GREAT PRESERVER.

Keeps auto like new without washing.
Prevents cracking and checking of varnish.
Makes old cars like new. Guaranteed. Saves
paint bills. Trial can 50c by mail. Enough
for two months' treatment.

SHINAUTO MFG. CO., INC.,
1137-1139 No. Illinois St., Indianapolis, Ind.

STOP THAT LEAK IN YOUR RADIATOR
with one ounce of Overton's Radiator Leak
Compound. A pound can by parcels post
for 50c cash. N. L. Overton, 1109 4th Ave.,
Council Bluffs, Iowa. Prices to dealers.

"STOP THIEF"

Patented lock for Ford and other small
cars. Impossible to start motor. Two keys
with each lock. Sent prepaid, \$1.50. May
save price of your car.

MARSHALL, WALTER & CO.,
Milwaukee, Wisconsin.

TOPS BUILT, RECOVERED AND RE-
paired. Also top covers, radiator covers,
luggage cases, celluloid, etc. C. G. Meyer &
Son, Tiffin, Ohio.

TOURING ROADSTERS, RACING BODIES,
Seats, special and stock sizes. Radiators,
hoods, tanks and fenders for any car. Get
our prices.

AUTO SHEET METAL WORKS,
1534 Michigan Ave., Chicago.

THAT MYSTERIOUS RAG DUSTER.

For dusting and polishing automobile
bodies, windshields, lamps, pianos or any
other polished surface. House Size 25c.
Automobile Size 50c. Sent to any address
upon receipt of price. If not satisfied, re-
turn duster and we will refund purchase
price.

THE GEM SUPPLY,
1036 So. Main St., Waterbury, Conn.

TRUFFAULT - HARTFORD SHOCK AB-
sorbers; \$45.00 kind; \$20.00 set of four.
PURITAN MACHINE CO.,
417 Lafayette Blvd., Detroit, Mich.

WE CARRY COMPLETE STOCK OF
Parts for all Thomas models.
E. R. THOMAS MOTOR CAR COMPANY,
1200 Niagara St.,
Buffalo, N. Y.

WE HAVE SEVERAL SLIGHTLY USED
magnets which we will sell very cheap.
LUVIERNE AUTOMOBILE CO.,
Luverne, Minn.

WE MAKE FORD RACING TYPE BODIES
in several models for immediate delivery.
AUTO SHEET METAL WORKS,
1532 Michigan Ave., Chicago, Ill.

WELDING PLANTS THAT ARE SAFE

\$50.00 to \$175.00. Carbon Remover with each
welder. Your credit is good with us. The
welder pays for itself and you save the mid-
dleman's profit. Write for terms. Address
Manager, Dept. G.

BERMO WELDING APPARATUS CO.,
Omaha, Neb.

WESTON MOTT HIGH GRADE REAR
axles, \$45.00. Other bargains, too.
PURITAN MACHINE CO.,
412 Lafayette Blvd., Detroit, Mich.

WE TEAR 'EM UP & SELL THE PIECES

We want old autos, condition no object.
We will buy anything for the auto. We have
all kinds of parts, many of them new, at
unheard of low prices. Tires and tubes,
many new, others used. Kingston carbu-
retors, all sizes; will exchange for others.
Gears of all kinds, new gas oval tanks, new
timers, magnetos, coil. Stewart speedom-
eters, shafts and chains, tire covers, dust
hoods, electric horns, new brass bumpers,
lamps, all kinds; Prest-O-Lite tanks, oilers,
cylinders, pistons, transmissions, crank-
shafts, seats and bodies; new 30x3½ wheels,
many other used sizes; rims; several chassis
without engines; 2-cylinder, 4-cylinder, 6-
cylinder engines; springs; in fact, every-
thing that an auto needs. Correspondence
solicited. If we do not have it, will advise
you where you can get it. Anything bought
can be returned at once, unused, carriage
prepaid, and we will refund amount paid.

AUTO WRECKING CO.,
Old Church, 18th and Oak,
KANSAS CITY, MO.

50c ON THE DOLLAR.

120-gal. Bowser pump, Weaver auto jacks,
3 vises, Dalton adding machine. 100 asst'd
new plugs, all makes, 12½c each. Sturdy
Mfg. Co., 2637 Mich. Ave., Chicago.

50 NEW PRESSED STEEL FRAMES, 163"
long, 34" wide. Each, \$10.

Send for sketch.
Lucas & Son, Bridgeport, Conn.

Cycle Car Accessories

FOR SALE, CHEAP—CYCLE CAR, FRIC-
tion complete, axles V pulleys and wheels,
tires, steering gear, frame, etc; or will trade
for motorcycle. Chas. Burger, 614 Cook St.,
Portage, Wis.

STEERING KNUCKLES, YOKES, FRONT
axles, springs, wheels, and friction trans-
missions.

MINNEAPOLIS MOTOR CO. AGENCY,
1123 Michigan Ave., Chicago.

V PULLEYS, 1½x7, ALSO FLAT BELT
pulleys 2x7.

F. MacVicar,
214 Milton Ave., Syracuse, N. Y.

Cars Wanted

CASH FOR HUPP 32 TOURING CAR.
Must be bargain.

BATES BOOT SHOP,
Lansing, Mich.

HALF SECTION OF GOOD SMOOTH RAW
prairie near Fort Yeates, N. D., to trade
for used cars. This land is all tillable and
the soil is of the best quality. New rail-
road line now building right past this land.
Price, \$27.50 per acre. Clear of encumbrance.
Will accept good used cars for the whole
tract or will take a first mortgage back on
the land and cars for the balance. Address
Box 231, Sweet Springs, Mo.

WANTED—FOR CASH, 5-PASSENGER
touring car; must not be older than 1913
or 1912. Address E. J. K., 2342 Millard Ave.,
Chicago.

WANTED—TO TRADE 160 ACRES OF
land in Colorado for 1914 6-cylinder touring
car. Chalmers or Buick preferred. G. W.
Allen, Portland Mich.

Parts and Accessories

WANTED

WANTED—NEW SIX CYLINDER MOTOR
of about 300 cu. ins. displacement (more
or less), not more than 36 ins. in length
from fan to rear face of flywheel. J. E.
Barker, 1054 Milwaukee St., Denver, Colo.

WANTED—OLDSMOBILE AUTOCRAT
parts, radiator, springs, magneto, intake
manifold, wheels, steering wheel and throt-
tle and spark control rods and handles. Also
might use 2 or 4 passenger body and dash.
C. D. Enfield, Jefferson, Ia.

WANTED—SET OF FORD TOURING CAR
side curtains. Cheap.
AUTOMOBILE SUPPLY CO.,
Burlington, Wisconsin.

WANTED—TO BUY PREST-O-LITE GAS
tanks for cash. Also automobile supplies
of all kinds. Please state lowest price you
will sell for. I pay cash on delivery.
Walter R. Ebert, 959 34th St., Milwaukee,
Wis.

WANTED TO BUY A GOOD 4 CYL. OR 6
cyl. gasoline motor.
Greer College of Motoring,
1456 S. Wabash Ave., Chicago.

For Sale or Exchange

FOR SALE OR TRADE—A 1-TON BUICK
truck, \$375.00. One Model 38 Overland
30 H. P., \$375.00. Special price for cash.
Albany Auto Co., Albany, Wis.

Situations Wanted

AUTOMOBILE ENGINEER OPEN FOR
position; 15 years' European and Amer-
ican experience designing and manufacturing
both commercial and pleasure vehicles.
First class references as chief engineer. Ad-
dress Box E 63, c/o Motor Age.

SITUATION WANTED BY CYCLECAR EN-
gineer—Experienced in design and con-
struction. Address Box E. 80, c/o Motor
Age.

EXPERIENCED SALESMAN, HAVING
eight years' experience selling automobiles,
desires to connect with a distributor who
would appreciate the services of a business
producer. A-1 references. Address Box E 17,
care Motor Age.

MR. EMPLOYER:—IF YOU ARE LOOKING
for an electrical engineer thoroughly
familiar with automobile electric starting,
lighting and ignition systems, one who has
made good in his present position but is
looking for a larger field, kindly let me
make individual application to you. Ad-
dress E 75, c/o Motor Age.

POSITION AS CHAUFFEUR—PARTIES
desiring sober, reliable man, 5 years' ex-
perience. Drive or repair any make. Fur-
nish best of reference. Touring preferred.
Unmarried. C. E. T., Box 113, St. Elmo,
Ill.

POSITION AS REPAIR MAN, OUTSIDE
of Chicago, desired by young man with 6
years experience. Best of references. Ad-
dress Box E 76, c/o Motor Age.

POSITION AS SALES MANAGER
Or assistant. Five years practical expe-
rience, thorough knowledge of men and meth-
ods, and wide acquaintance with automobile
trade. References furnished to prove my
ability to get results. Am 37 years of age,
wide awake, active, and a close student of
conditions pertaining to the development
and conduct of the automobile business.
Address Box E 79, c/o Motor Age.

POSITION WANTED—MANAGER FIRST
class garage or foreman first class repair
shop. Eight years' experience. Expert me-
chanic, reliable, sober. Only solid firms an-
swer. For further particulars address R. J.
Marquard, 1026 N. Water St., Decatur, Ill.

REPAIRMAN, 11 YEARS EXPERIENCE, 5
years as foreman, wishes position. Knows
the repair business and how to handle men.
Age 31, married. Excellent references. Box
E. 73, c/o Motor Age.

SALESMAN

Eight years' experience as District Man-
ager and Traveling Salesman, open for po-
sition after April 1st. Address Box E. 62,
c/o Motor Age.

SITUATION WANTED BY A FIRST CLASS
second-hand automobile salesman. Am at
present connected with largest second-hand
exchange in the South. Would consider a
change; will take charge of second-hand
department. Am married and can furnish
the best of reference. Address Box E 66,
c/o Motor Age.

YOUNG MAN, 27, SINGLE, RECENTLY
out of college, would like position as
demonstrator or salesman with factory
branch or sales agency where there is a
chance for advancement. Have been driving
own cars for the last five years. Four years
business experience before going to college.
Address Box E 47, c/o Motor Age.

WANTED—POSITION BY WORKING GAR-
age foreman. Fifteen years experience;
will guarantee to build up garage. (A repair
man that can repair.) Address Box E. 78,
c/o Motor Age.

Help Wanted

AUTO ACCESSORY SALESMAN WANTED
to sell our guaranteed auto tire reliners,
double locks, inner and outer shoes, etc.
Liberal commissions and exclusive territory.
AMERICAN RUBBER PRODUCTS CO.,
24 So. Clinton St., Chicago, Ill.

DO YOU WANT \$25.00

Mail us the names, business and address of people who are going to buy automobiles this season. If we sell them we will give you \$25.00. Send in your list today. Stewart Fulmer Auto Co., 1638-40 Wabash Ave., Chicago.

REPAIR MAN WANTED, MUST BE GOOD lathe hand and familiar with electric starters. Steady position for right man. State wages expected, experience and reference. R. D. Cookingham, Ellenville, N. Y.

SALESMEN DESIRING A FINE QUICK- selling, profitable side line, should address GATES MFG. CO., Indianapolis, Ind.

TRAVELING SALESMEN

We want connections with men calling on automobile trade in different sections. No interference with regular line.

Address Box E. 81, c/o Motor Age.

WANTED - AUTOMOBILE ACCESSORY salesmen to handle our inner-liners and blow-out sleeves in any state, either as complete or side line. Address Lion Liner Co., Sheboygan, Wis.

WANTED - CARBURETOR SALESMAN

and demonstrator. Must give best reference. Address Box E 34, c/o Motor Age.

WANTED-FIRST CLASS SALESMAN.

Must be a man of wide experience, good judgement, character and appearance, capable of handling a large territory and able to produce big results. We do not care to receive applications from "has beens" or men without experience. This is the largest Motor Accessory house in America. The line requires close application and effort. Experience in this particular business is desirable, although successful hardware or mill supply man will be considered. Compensation commensurate with results. Apply, stating age, full record of experience, lines handled and references, indicating whether you have preference of location. Address Box E 71, c/o Motor Age.

WANTED

Repair man that can tell the troubles of a motor and fix them. 125 miles from Chicago, fine locality on C. B. & Q. R. R. No booze or cigarettes. Address Box E. 69, c/o Motor Age.

WE ARE CONSTANTLY IN TOUCH WITH

Employers requiring High-Grade Engineering service. Are you listed with The Toledo Engineering Agency, Toledo, Ohio?

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AGENTS—HIGH-GRADE AUTO NECES- sity. 100% profit. The Perfect Auto License Holder, weighs 8 ounces. Every auto owner a prospect. Placed on car without tools in 2 minutes. 25 sets sold daily easily. Send 25c for agent's sample pair to The Cornelius Auto Sales Co., Toledo, O.

AGENTS WANTED.

Attractive terms to dealers on our Ampvo Batteries. Some exclusive territory still open.

The Ampvo Battery Co.,
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WANTED—AGENTS TO SELL PORTABLE welding plants, oxygen carbon removers, electric horns, C-Well rear sight mirrors, Skidoo soap and Milwaukee Auto Specialty Co.'s line. Exclusive territory and liberal commission to the right parties able to devote their entire time to their sales.

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EXCLUSIVE AND SIDE LINE SALESMEN for spark plugs and accessories. Well established. Good chance for right man. Sturdy Mfg. Co., 2637 Mich. Ave., Chicago.

YOU CAN GREATLY INCREASE YOUR income by representing our line of lighting systems; our MATCH LIGHTING LAMPS sell like wildfire both in town and rural districts. No experience required, profits large, exclusive territory to right parties. Don't delay writing for free catalogue and full information. Doud Lighting Co., 175-F No. Sangamon, Chicago.

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ENGINEER TAKING A BUSINESS TRIP to the Scandinavian countries during the summer months desires to represent American automobile manufacturers. Speaks the Scandinavian languages. Box E 60, care Motor Age.

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AN UP TO DATE GARAGE BUSINESS with tools, gasoline filling station; time on lease 3 years. Shop, tools and complete line of supplies, all on business street of town. Garage room for 30 cars. Address Box E 67, c/o Motor Age.

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Auto and general repair business in Indiana city, population thirty thousand. Equipment complete, machine shop. Well known. Central. Address Box E 68, c/o Motor Age.

FOR SALE—FIRST CLASS GARAGE AND accessory store located in a live town in the Sunny South; doing good business every day of the year. Have agency for the Ford, Paige and Chalmers. Best three sellers in the United States. Sold 70 Fords last year. Have better prospects this year. An investment of \$8,000.00 will earn three to five thousand per year net. Full investigation permitted. Address Box E 77, c/o Motor Age.

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I HAVE PATENTS AND A WORKING model of a one cycle gas-engine. Need capital to launch proposition. Model will speak for itself. Inquire of
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WHAT MAKE DO YOU USE?
What size?

Write for my price bulletins.
We pay express charges.
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30 x 3\$5.80 32 x 3 1/2\$7.80
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No seconds. We can quote you a very attractive price on any of the high-grade makes. Write for prices, stating size wanted. We sell for cash, and can undersell others.

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New and used. Write for prices.
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Prices are Low.
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WE ARE THE OLDEST AND LARGEST magneto repair firm in the country. All makes of magnetos and coils repaired, sold and exchanged. Write for prices.
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STARTING AND LIGHTING SYSTEMS and storage batteries overhauled and repaired. We charge no more for expert service than other concerns do for novices at the business. Rewinding of all kinds. Established in 1904.

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General Machine Work.

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Welding all kinds of metal.

EVERREADY AUTOMATIC ENGINE.

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4 cylinders \$3.00
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New pistons and rings fitted. Gears cut all kinds, nickel steel. We duplicate or weld the broken parts of any car. We weld broken aluminum and cast iron housing or cylinders and crankshafts. Ten years one stand. Over 20 years' mechanical experience. The Kent Auto Co., Denver, Colo.

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We have special equipment for regrinding cylinders, fitting new pistons and rings. Prices, \$7.00 to \$15.00 per cylinder.

Autogenous Welding.

Magneto and Battery work.

Prompt Service.

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and fitted with new pistons and rings for \$15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description.

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NEW PISTONS, RINGS, PINS.

Our special equipment for grinding Ford Model T cylinders enables us to fit new pistons, new rings, and piston pins on short notice. A complete job better than new at prices that will interest Ford dealers as well as owners.

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NEW SPRINGS AND REPAIRS
FOR ALL CARS.

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Tel. Calumet 1081.

HAVE YOUR CYLINDERS REBORED

And reground and fitted with my racing pistons and my new patent leakless rings. Guaranteed to give 35 per cent higher speed, power and economy. Also make gears of all kinds and push rods and piston pins of chrome nickel steel, hardened, tempered and ground, superior to factory; also cranks, connecting rods, crank cases or any part, and make special motors; send parts to the shop of quality.

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Cast Iron and Aluminum a specialty.
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Autogenous welding of all metals, such as crank cases, cylinders, etc. We positively guarantee all work. Tel. Calumet 3563.

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Expert Welders on Automobile Parts.
Reliable Welding Outfits for Repair Shops
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\$45

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cylinders, flywheels, gears, pistons perfectly welded and machined, ready to replace. Scored cylinders made new. Booklet Atlas Welding Works, Rahway, N. J.

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OXY-ACETYLENE WELDING, AND MET-

als welded. Piston pin scored cylinders mended by this process. Pistons, piston pins and cylinder rings made for all old-style cars. General repairs made in high class manner, prices right and all work guaranteed. Henry M. Williams, Vincennes, Ind.

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Guarantee

our welds to hold, cylinders (cracked in or outside), crankshafts, aluminum crankcases, transmission cases, housings, etc., by the Oxweld process of welding and cutting metals.

Estimates furnished for job or repair welding and cutting operations of all kinds. Oxweld Acetylene Co., 27th and Jasper Pl., Chicago, Ill. Downtown receiving station, 557-561 W. Jackson Blvd.

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Any make repaired and returned same day. Radiator to fit any car shipped in three days.

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Expert repair work on Radiators, Hoods, Fenders, Dashes, Tanks and Drip Pans.

We guarantee all our work.

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ALL KINDS OF AUTO RADIATORS, hoods, fenders, lamps, windshields, etc., rebuilt and repaired. All work guaranteed. Phone or mail order. L. Blumenfeld & Co., 1919 Wabash Ave., Chicago. Tel. Cal. 4583.

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ONLY RADIATOR FACTORY IN NORTH- west. Pioneer manufacturer. Why send your radiator down east when you can ship it to us; save time, express, freight, money, and get best workmanship. Prices right. Make new radiators; allow for old one.

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THE M. & L. AUTO SHEET METAL

Works rebuild and repair radiators, hoods, fenders, tanks, lamps, etc.

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OREGON — SIXTEEN THOUSAND 1914 registered motor vehicle owners. Business address; make, style of vehicle. Monthly publication \$3 per year. Multnomah County Credit Sheet \$1 per month. Daily registration cards, \$5 per M. M. O. Wilkins, 326 Mohawk, Portland, Oregon.

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Send for complete circular.
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Special prices to Ford Owners for all makes of Speedometers and Parts.

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All kinds of special work, single bodies or quantity orders. Ford closed bodies, coupe, sedan and cabriolet. Ford delivery bodies. Prompt shipment on fore doors.

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Our stock of new and used Automobiles is the largest in the world

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ALL HIGH GRADE CARS.
 ROADSTERS, TOURING,
 LANDAULET & LIMOUSINE.

TRUCKS 1, 1½, 3 and 4-ton Capacity.

at half regular prices

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All the above cars in first-class running order.

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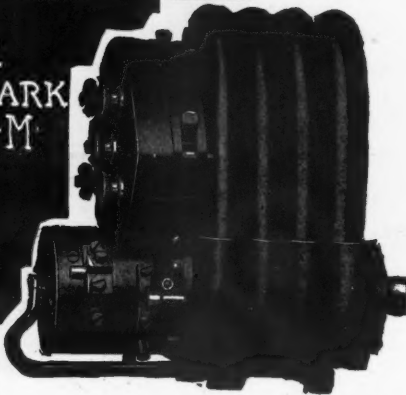
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INSURE
A STEADY SPARK
AT ANY R.P.M.



HECO MAGNETOS are the product of experts specialized in the electrical business. They embody all that the electrical industry knows about magnetos.

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HECO MAGNETOS supply a spark of equal intensity for any number of revolutions per minute.

We also make the well-known HECO COILS, and HECO COMBINATION PRIMERS AND SPARK PLUGS. Let us send you our complete catalog.

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Factories and Gen'l Office, Lowell, Mass.
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597

Our New 1914 Model "T" FORD Special Master Vibrator

At \$10.00 and Our
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List Price \$10

with Kick or Yale Lock Switch at \$14.00 and \$16.00 are unquestionably superior to any existing type in operation, appearance, mechanical and electrical design, and enjoy a larger sale than any similar device.

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WESTERN BRANCH, 1429 Michigan Ave., Chicago

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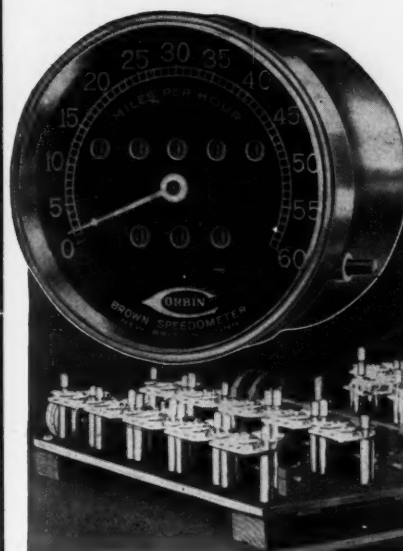
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Z

ORBIN-BROWN SPEEDOMETER



"The Speedometer
of Absolute
Accuracy"

Illustrating a twenty-four hour running test to which all trip odometers are subjected

THIS illustrates but one phase of the extreme care taken in the manufacture of the Corbin-Brown Speedometer to insure the production of a recording instrument of the highest possible efficiency.

During this test the odometer is "trued" to unerring accuracy.

The most minute flaw in metal—the slightest imperfection in workmanship or any other fault that might contribute toward inaccuracy is quickly discovered and immediately remedied.

Every Corbin-Brown Speedometer is perfect before it leaves the factory.

Every Corbin-Brown Speedometer is guaranteed for a full year of service.

Write today for new 1914 catalog

The Corbin Screw Corporation
THE AMERICAN HARDWARE CORPORATION, Successors
New Britain, Conn.

BRANCHES: New York Chicago Philadelphia

When Writing to Advertisers, Please Mention Motor Age.

"38" *Packard* "48"
SIX-CYLINDER CARRIAGES



THE bridge builder's factor of safety is built into every Packard car.

Combined with luxury of motion—silence—certainty of performance—is durability far beyond the requirement.

Six-inch depth of frame is typical of the maximum service quality in Packard construction.

Packard cars demonstrate their supremacy at the time when stamina is most needed.

PACKARD MAXIMUM SERVICE QUALITIES
ARE EMBODIED ALSO IN PACKARD TRUCKS

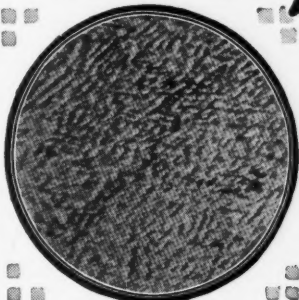
Packard Motor Car Company, Detroit

LINCOLN HIGHWAY CONTRIBUTOR

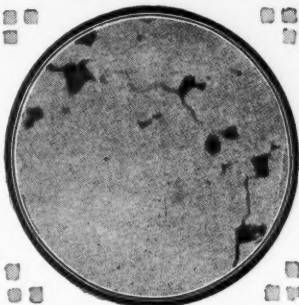
Ask the man who owns one



Steel as received at the factory, before heat-treating.

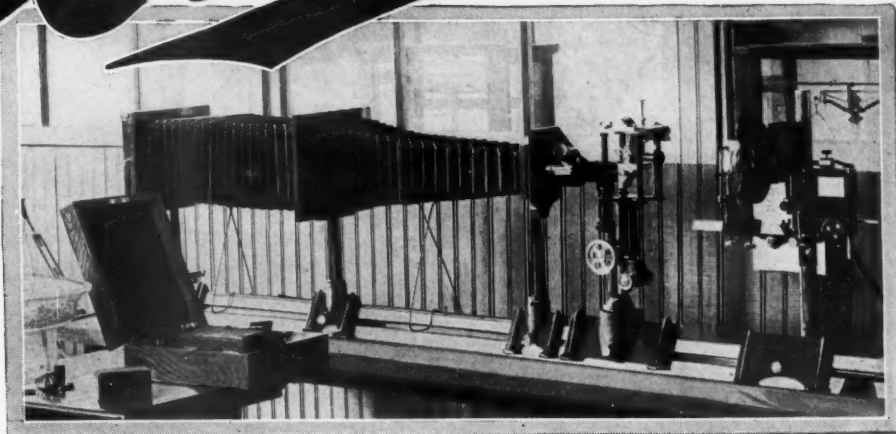


The same steel as above, after heat treatment, ready for use.



Specimen showing defects. This steel would be rejected.

Overland



Looking Into Overland Materials

THE metals used in Overland cars are not merely looked *over* before being accepted. By the aid of the expensive and extremely sensitive instrument shown above they are actually looked *into*.

This instrument is the highest-powered microscope known to modern science. It enlarges objects to be examined 2000 times if necessary, revealing the nature and quality of every atom of their construction. A special camera attachment produces a photograph which is a permanent, truthful and indisputable record of what the material contains. Our expert metallurgist can tell instantly, on examining a piece of steel through this instrument, whether it is suitable for use in the Overland.

If sulphur, phosphorus, or other impurities are present in sufficient quantities as to prove detrimental to the long life or proper wearing qualities of the material, all this stock is rejected. It cannot reach the factory.

All impurities and all desired elements, such as carbon, manganese, silicon, chromium, nickel, etc., are determined accurately in the chemical laboratory.

Similar care is taken at every step in building the Overland. We have hundreds of thousands of dollars worth of special machinery and instruments for seeking out potential weaknesses. Only the best of materials are good enough for the Overland.

And yet the Overland costs you 30% less than other cars of equal size, power and quality. This is because we purchase, manufacture and market in the largest quantities.

Call on the nearest Overland dealer or write us direct for catalogue and descriptive literature.

Please address Dept. 46.

\$950

Completely
Equipped
f. o. b. Toledo

The Willys-Overland Company

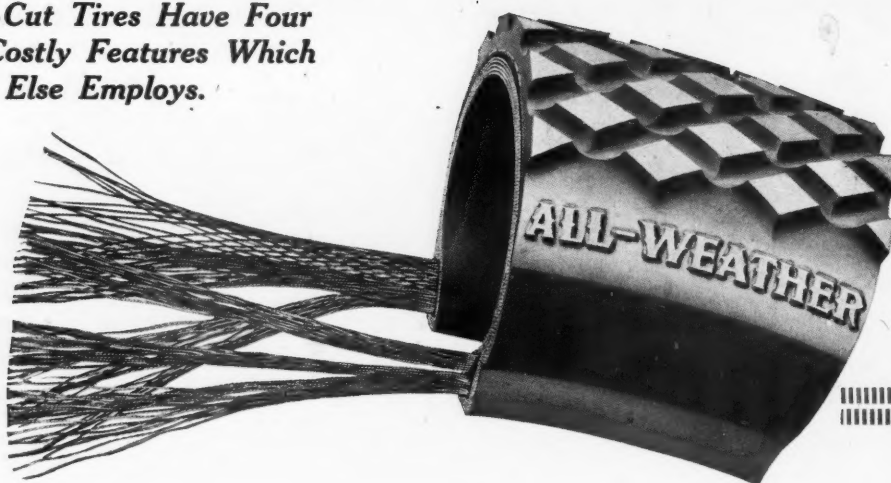
Toledo, Ohio

Manufacturers of the famous Overland Delivery Wagons, Garford and Willys-Utility Trucks. Full information on request.

\$1075

With electric
starter and
generator
f. o. b. Toledo

No-Rim-Cut Tires Have Four Great, Costly Features Which No One Else Employs.



The Price We Pay

For Leadership in Tiredom

The Figures Are These:

Our sales last year were \$33,000,000. Almost \$8,000,000 over the year before, despite enormous price reductions. Almost \$20,000,000 more than 1911. Almost 16 times our sales in our ninth year of tire making.

We sold last year eleven times as many tires as in the fiscal year of 1909. We are selling now 35 per cent more than last year.

Our rapid growth came when cars in general were equipped to measure tire mileage. It was odometer figures that rushed Goodyear to the top.

How We Earned It

No man can doubt that, in some way, Goodyears earned this verdict. It is based on over three million tires.

In some way we gave men more for their money—more mileage, less trouble, less upkeep. And this is how we did it.

We set scores of experts at research and experiment. We appropriated \$100,000 yearly for this work.

We built in our laboratory, every day, experimental tires. We built machines to test them, and we compared them on the road.

Thus, month by month, these tires were bettered until we reached the limit. Until a thousand attempts had failed to show an improvement.

Things We Fought

We found that tires were largely wrecked by rim-cuts. Almost one in three, as per our last statistics on the old-type tires.

We invented No-Rim-Cuts, the hookless tires. The tires with six flat bands of braided wire vulcanized into the tire base. See picture at the top. That feature—which we still control—completely ended rim-cutting.

We found that countless blow-outs were due to wrinkled fabric—wrinkled by curing on an iron core. So we final-cured all tires on air bags, shaped like inner tubes. Cured them under actual road conditions. That stopped this waste, but it adds to our tire cost \$1,500 daily.

We found that loose treads ruined many tires. So we paid \$50,000 for a method to combat them. That patent

method is now employed in every No-Rim-Cut tire.

We found that anti-skid treads too often meant short-lived tires. They centered strains at small points in the fabric. So we invented the All-Weather tread. A flat, double-thick tread, as smooth as a plain tread, but affording resistless grip. And that tread is now fast supplanting the plain tread.

Done by Us Alone

All these costly, mileage-adding features are used by us alone. Nobody else builds tires like No-Rim-Cuts. Nobody else cures on air bags. Nobody else so combats loose treads. Nobody else uses All-Weather treads.

At first, when our output was limited, we had to ask high prices for such tires. But prices came down as our output went up. Now many tires lacking all these features cost far more than Goodyears.

There are very big reasons why No-Rim-Cut tires gained their matchless prestige. They have proved their economy to hundreds of thousands. They will prove it to you when you let them.

Won't you give them a chance when you next buy tires?



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Toronto, Canada
Dealers Everywhere.

London, England
Branches and Agencies in 103 Principal Cities.

Mexico City, Mexico
Write Us on Anything You Want in Rubber.